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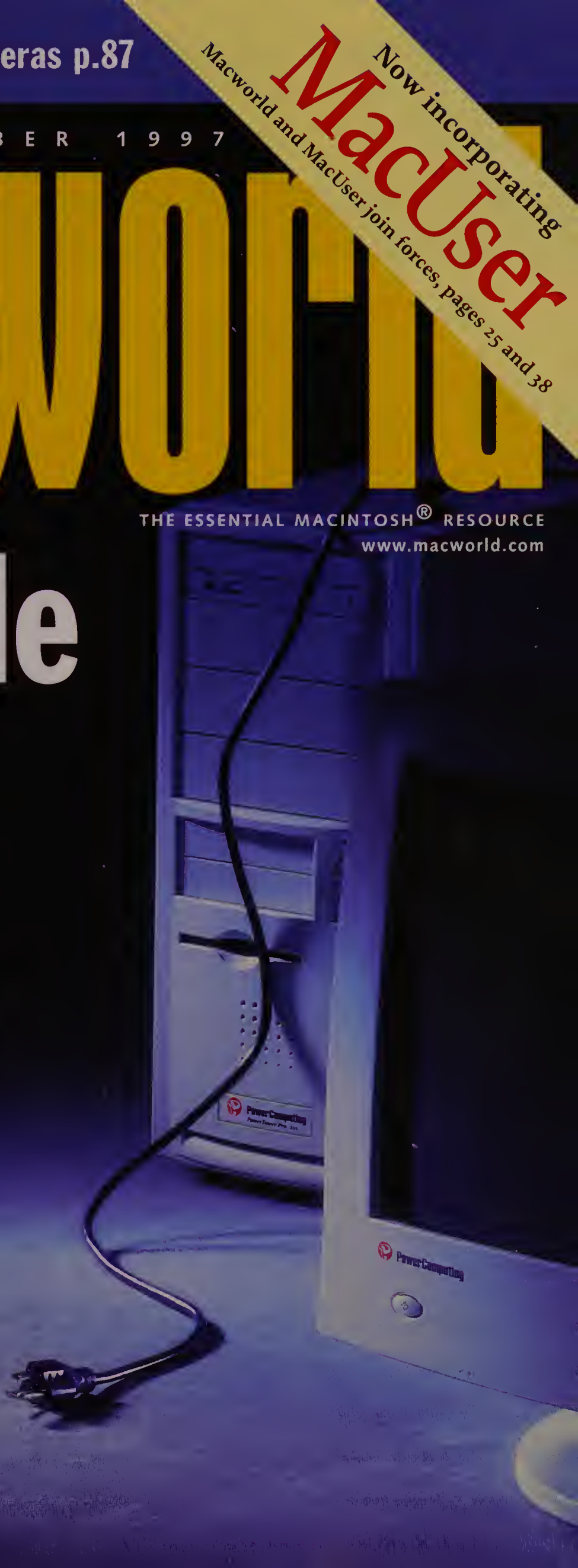
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Press Release

Apple to Acquire Power Computing for $100M

CUPERTINO, Calif.--Sept. 2, 1997--Apple Computer, Inc. announced today that it will acquire Power Computing Corporation's core assets in a deal valued at $100 million in Apple common stock. Included in the key assets Apple will acquire are the right to retain key employees with expertise in direct marketing, distribution, and engineering; Power Computing's customer database; and the license to distribute the Mac OS operating system.

"Power Computing has pioneered direct marketing and sales in the Macintosh market, successfully building a $400M business," said Steve Jobs, Apple Board member. "We look forward to learning from their experience, and welcoming their customers back into the Apple family."

"Power Computing is grateful for the tremendous support and encouragement we have received from the entire Macintosh community," said Stephen Kahng, Power Computing founder and CEO. "We believe that in our small way, we have helped to make the Macintosh stronger, and that the spirit of Power will live on."

Power Computing will retain the Power Computing name and has stated it will sell Mac OS compatible computers through Dec. 31, 1997. Apple will provide ongoing Mac OS support to Power Computing customers and Power Computing will continue to provide hardware and warranty service to its customers.

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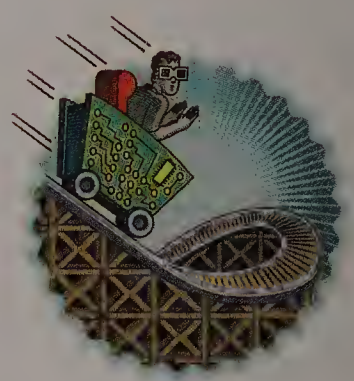
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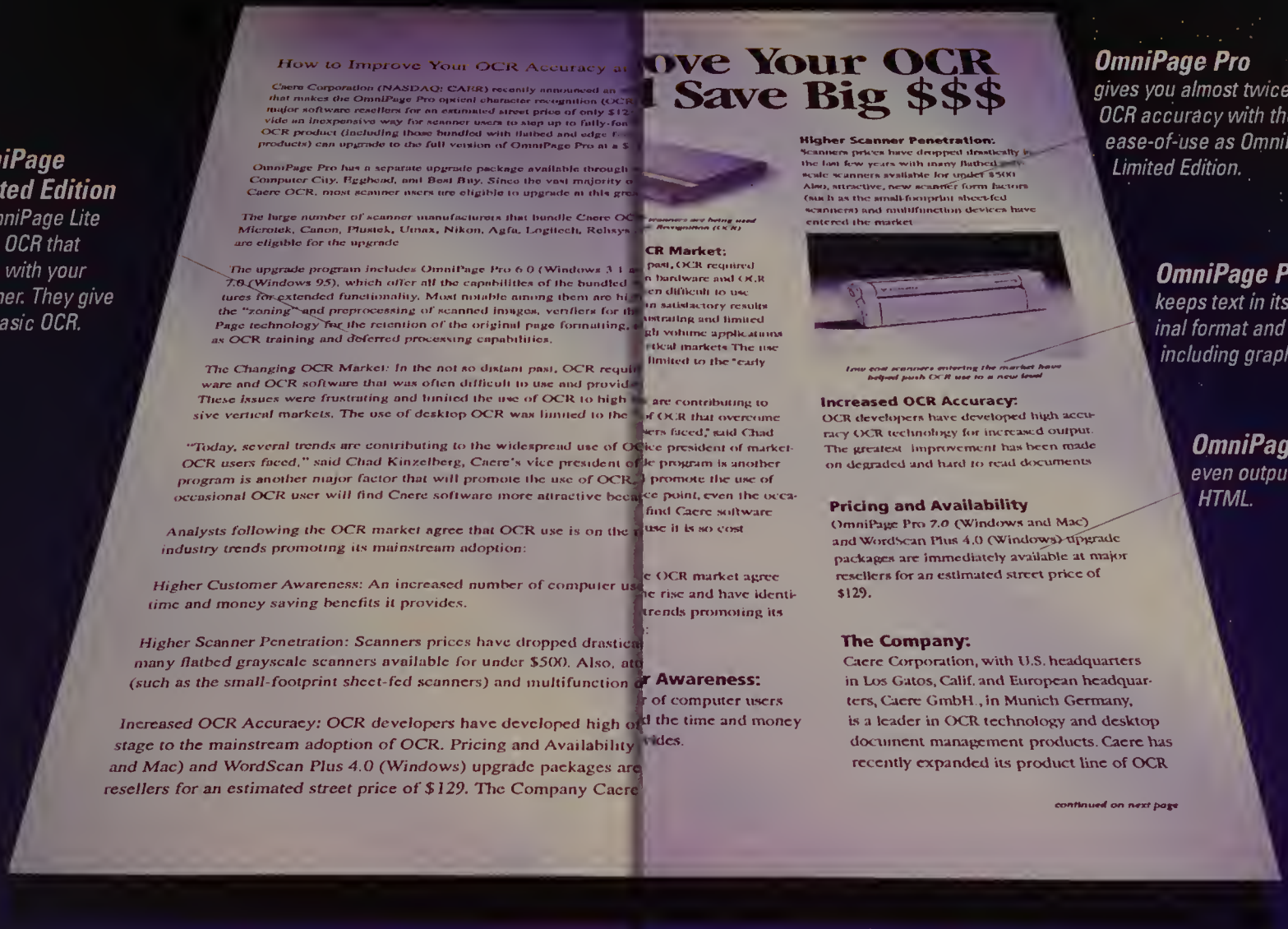
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ware and OCR software that was often difficult to use and provid
These issues were frustrating and limited the use of OCR to high
sive vertical markets. The use of desktop OCR was limited to the

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OCR users faced," said Chad Kinzelberg, Caere's vice president of
program is another major factor that will promote the use of OCR.
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Analysts following the OCR market agree that OCR use is on the
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time and money saving benefits it provides.

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ove Your OCR
d Save Big $$$

Higher Scanner Penetration:
Scanners prices have dropped drastically in the last few years with many flatbed gray-scale scanners available for under $500. Also, attractive, new scanner form factors (such as the small-footprint sheet-fed scanners) and multifunction devices have entered the market

scanners are being used
Recognition (OCR)

CR Market:
past, OCR required
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in satisfactory results
strating and limited
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ocal markets The use
limited to the "early

are contributing to
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ice president of market-
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use it is so cost

e OCR market agree
e rise and have identi-
trends promoting its

r Awareness:
of computer users
d the time and money
vides.

Low cost scanners entering the market have helped push OCR use to a new level

Increased OCR Accuracy:
OCR developers have developed high accuracy OCR technology for increased output. The greatest improvement has been made on degraded and hard to read documents

Pricing and Availability
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The Company:
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continued on next page

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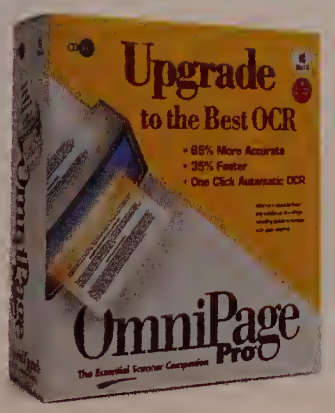
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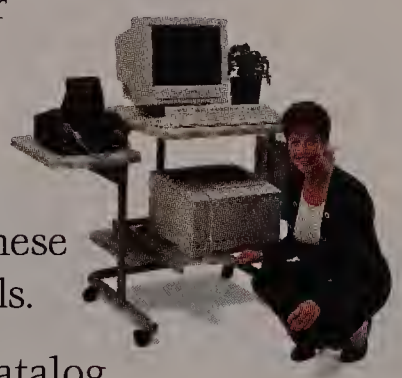
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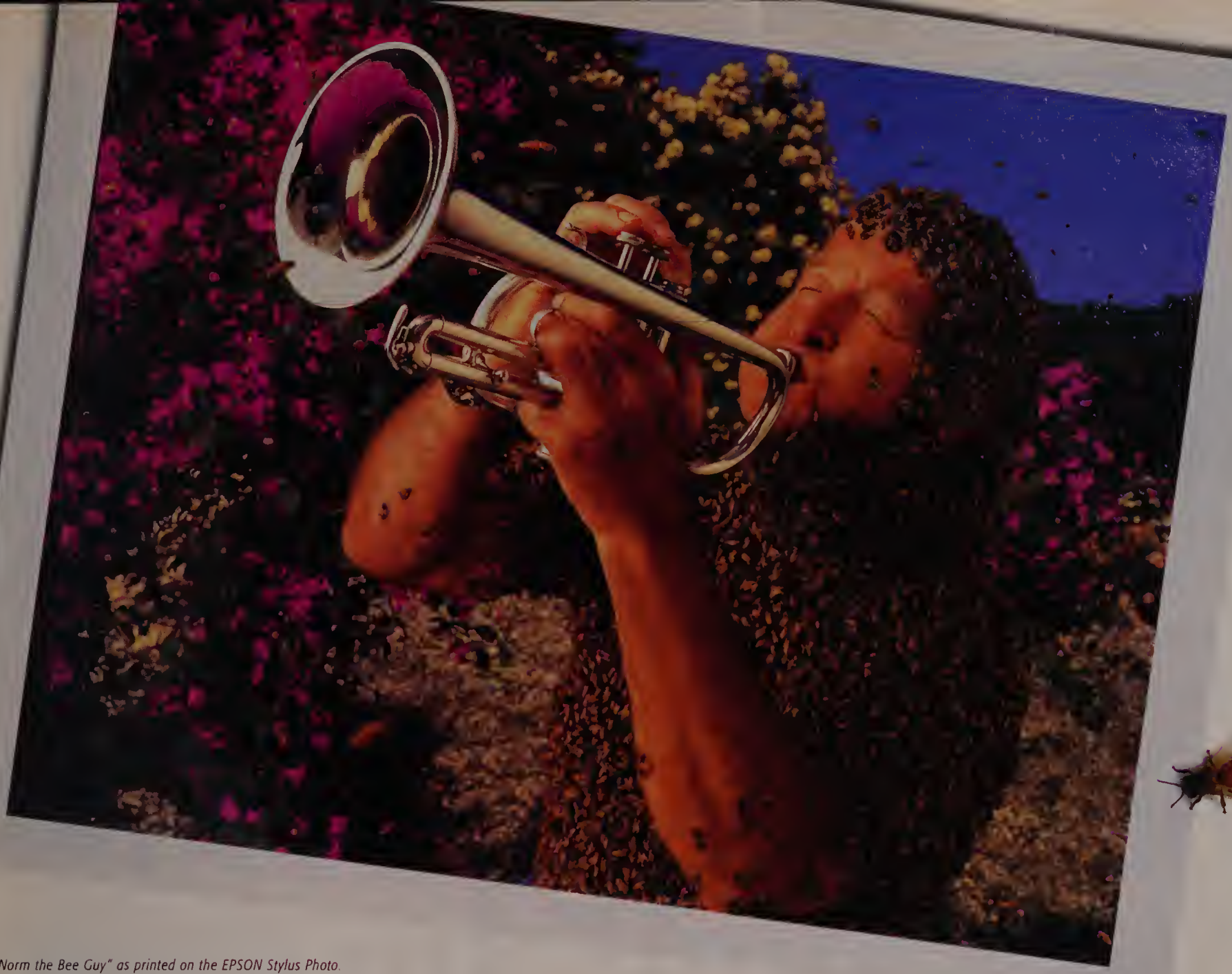
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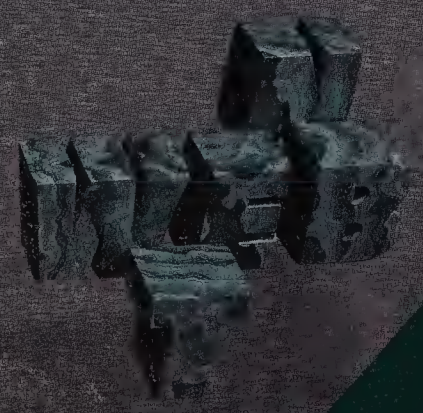
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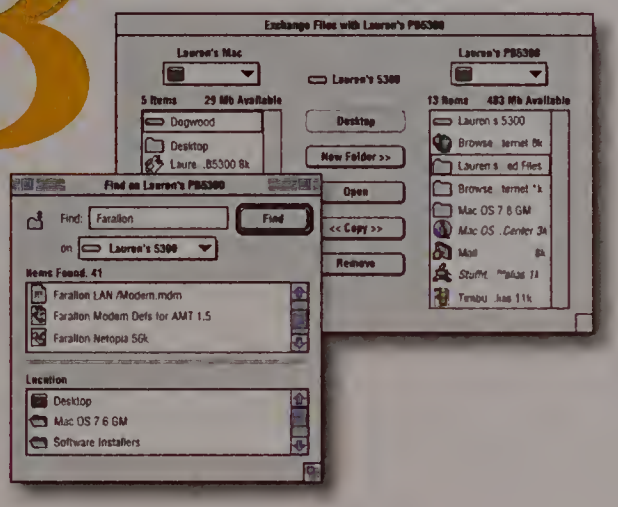
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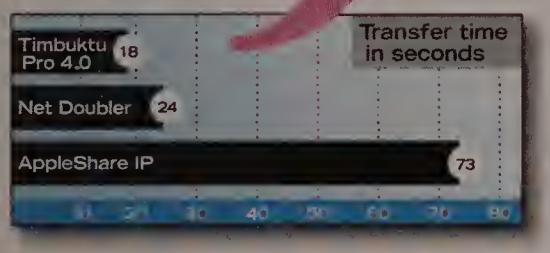


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Letters

Another Windows User Sees the Light

I AM VERY EXCITED TO BE HOLDING MY first subscribed issue of *Macworld.* I even ordered my subscription on your easily navigated Web site, and I am impressed with the layout of your magazine even more. Thumbs up to all the women and men who make *Macworld* magazine a top-notch pleasure to read.

In a few weeks, I will have my first Mac, specifically a PowerCenter Pro 180. The exciting part is that I was a Wintel user (I can't believe I typed that!) and still am, until my system gets here.

Basically, after researching the Macintosh for six months, reading various reviews and opinions on the Web and in articles, and having numerous problems with my current PC, I decided to convert to the "good" side of the force—er, I mean computing. Chalk up one more Mac convert on the board. It's a pleasure to be with the winning team.

JOHN DOWNING
via Macworld Online

It's a pleasure to have you. Welcome aboard. For those of you who aren't enjoying the benefits of Macworld, *as Mr. Downing points out, you can subscribe via Macworld Online (*www.macworld.com*).—Ed.*

Notable, Portable, and Storable

"STORAGE TO GO" WAS VERY INFORMAtive and loaded with detailed specs to back it up (August 1997). However, using most of these drives on a daily basis has brought to my attention other issues that were not mentioned in your tests.

I realize that lab tests indicate that Zip drives have half the speed of some other media types, but in the real world I can



JEFF NEUMANN

pull a large photo off a Zip and have the Zip back on the shelf faster than most other types can even be mounted.

RIK HOCKING
Aliso Viejo, California

Rhapsody for Bill?

I NEVER THOUGHT APPLE WOULD BE marketing its operating system to the Wintel world. It seems rather odd to me. However, it is going to happen.

What astonishes me even more, though, is the huge emotional response coming from Mac OS users. The same people who are supporting Apple one day are having a fit the next—all because Apple has made a decision to broaden its target market.

Think about it from a business point of view. Apple pays a little more money for the Windows compatibility than what it was already going to pay to develop its new OS. Subsequently, it'll have a product that will cover 99 percent of the computing market, as opposed to 35 percent or so. Yet I still see people in newsgroups proclaiming Apple Computer a traitor to its own kind. These are strong words.

We have all seen the reports. Apple was, and still is (though not to the same extent), in some economic trouble. By producing a product that could be the biggest-selling piece of computer software since DOS, Apple is not turning its back on its supporters, but rather looking out for them.

One might speculate that the continuation of the Mac OS depends on its being popular in the PC universe.

JON CRAIG
Bowling Green, Kentucky

I THINK THAT RHAPSODY FOR INTEL IS A bad idea. Its existence would be dangerous to all Mac makers. Why would PC users want to switch to Macs if they can use all of the new Mac software on their Wintel platforms? The Blue Box isn't the answer because if that was the case, Windows wouldn't be ahead in market share. The hardware isn't the answer either, for the same reason.

I understand why a cross-platform operating system would be useful to developers, but the Windows 95 and NT versions of Rhapsody would allow developers to create Rhapsody applications for PCs without the need for the additional Intel version.

Apple should drop the Rhapsody for Intel project and concentrate on the rest of Rhapsody. Rhapsody programs would still work on Intel-based machines, but Rhapsody for Mac would have the performance advantage.

GARTH WALLACE
via Macworld Online

continues

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Information Architect
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Clement Mok is an idea guy. As creator of award-winning corporate identities and design solutions for companies like Microsoft, Twentieth Century Fox, Herman Miller, as well as Apple Computer, ideas are the capital of his three companies. Whether he's creating a cyber themepark, compiling tons of stock photos, or designing the elaborate kingdom of Valhalla for the local opera, his ideas need space. Big space. Which is what he gets with the 1 gigabyte Jaz® drive.

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CORRECTIONS

- *Shockwave movies made in Macromedia's Flash do not stream as they download* (Reviews, *September 1997*).
- *The G3 Arthur CPU, also called the PowerPC 750, is made by IBM* ("*275MHz Mac Powerhouse*," *September 1997*).
- *APS Technologies can be reached at 816/483-6100, and DayStar Digital's phone number is 770/967-2077* (Mac Superguide, *September 1997*).
- *The NT module, Services for Macintosh, must be turned on via the NT server's network control panel* ("*Macs Can Thrive in an NT World*," News, *July 1997*).

Two Modems Are Better than One

IN THE AUGUST 1997 ISSUE, YOU LISTED "Ten Ways to Recycle Your Mac." Number five was to connect a group of modems together and attach them to a Mac to handle overnight downloads from the Internet. You called this multiplexing. Can you give me some more information on multiplexing? Some instructions on how to do it would be helpful, including what hardware-software combination I need.

ZACK M. BROCK
Hilliard, Florida

You need three things. First, your Mac must support multipoint PPP. You can find out by checking the documentation that came with your machine. Second, you need two or more phone lines. Each phone line must have a dedicated modem. Third, you need an ISP that supports multipoint PPP. You can call your ISP directly to find out. If it doesn't support it, you may be able to get a UNIX shell account (many ISPs offer these) and pair it with a freeware solution called Slirp to create the same effect. For more information on Slirp and how to multiplex, check out ucnet.canberra.edu.au/slirp/, www.phoneboy.com/slirp/, *and* www.56k.com/reports/bonding.shtml.—*Ed.*

Insanely Great Ads from 15-Year-Olds

I JUST SAW THE WINNING ENTRIES OF Apple's "Making Dreams Come True" contest. The contest centered around Mac owners' using their Macs to create 30-second spots showcasing the advantages of the Macintosh platform. After seeing all nine of these winners (three winners each in three categories: under 15, amateur, and professional), I have to conclude that Apple has done a terrible job of advertising.

Any one of these nine ads was infinitely superior to any ad I've seen from Apple (with the possible exception of the "1984" ad). These ads show real people using the Macintosh in real-world applications, and are done exceptionally well, even the under-15 ads.

Why doesn't Apple clean these ads up and start using them for TV spots? Just think of the headlines: "A Computer So Easy to Use, a 15-year-old Created This 30-Second TV Ad with It . . ." With all of Apple's advertising woes, an ad campaign like that could save a lot of money and get a lot of *good* exposure.

TED LEE
Norcross, Georgia

eMate Expansion Explained

THE EMATE 300 DOES PROVIDE USERS with a way to expand its memory by adding SIMM RAM to its internal RAM slot (*Reviews*, August 1997). You can buy this kind of special SIMM from Newer Tech (316/943-0222, *www.newertech.com*). This way, you don't have to sacrifice the only PC Card slot the eMate 300 has.

WEN-YU CHANG
San Jose, California

Take a News Break with Macworld

I REALLY ENJOY YOUR NEWS-BREAK broadcasts. I know they must cost some money to produce and maintain, but if you could increase the content through more interviews with your staff or other guests it would be appreciated. I love to listen to them while paying bills or surfing, and they seem to have become shorter recently. Anyway, I appreciate them. Thanks for the effort!

JAY BONNER
Eustis, Florida

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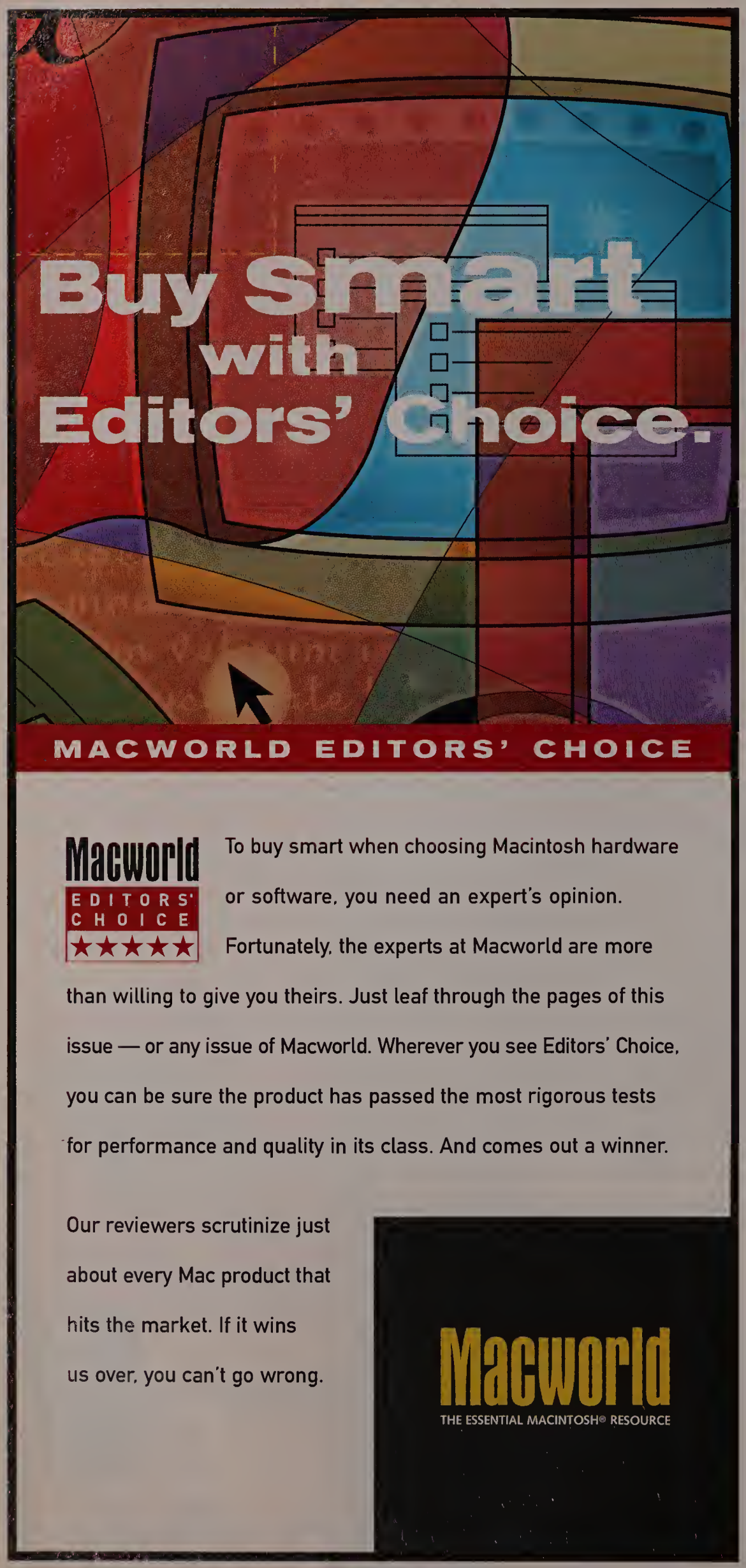
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Hear the latest about the Mac market, new technology, and developments at Apple from the people who know the most about it, at www.macworld.com.—*Ed.*

Of Upgrades and Utility Vehicles

I READ WITH GREAT INTEREST DAVID Pogue's recent article "The Software-Upgrade Paradox" (*The Desktop Critic*, August 1997). He asserts that Microsoft's move to a gargantuan Word version 6.0 divided users into two camps. Literary brevity is a necessity, but I'm sure Mr. Pogue recognizes that there are actually three camps: those who upgrade, those who don't, and those who switch.

The subtext of the article is very clear: Microsoft knows that it can act with impunity, and the masses must follow. I am very sorry to say it, but it seems that with Communicator Netscape is on the same road.

Faced with the choice he noted (step up to the lane-wide, road-hog, RAM-guzzling 6.0, or continue to cruise in my utilitarian 5.1 model), I did what many consumers do. I shopped, and ended up buying a foreign model, WordPerfect, and I'll never go back.

KELLY M. MCDANIEL
Austin, Texas

DAVID POGUE SAYS, "WHY ARE WE BUYing [all-terrain sport-utility vehicles]? Don't tell me it's just in case a flash flood washes out the road to the grocery store." Well, I drive a Toyota Rav4, a mini sport utility vehicle that gets excellent mileage, handles like a dream, and incidentally was the only vehicle to weather a flood and make it to work with myself and everyone else whose cars were underwater. Oh yeah, it sports a Mac sticker too.

SUNIL RAJAN
Ann Arbor, Michigan

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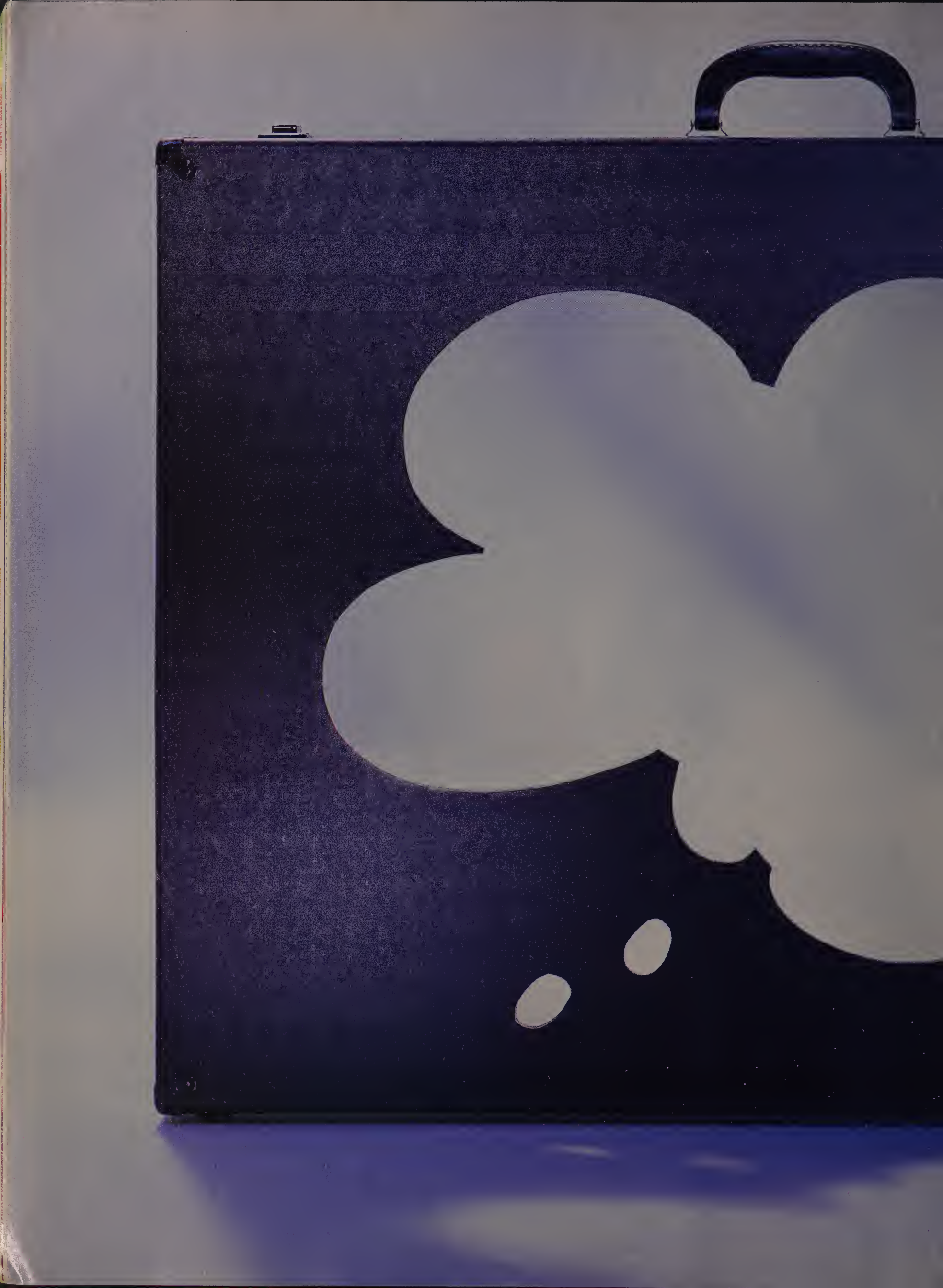
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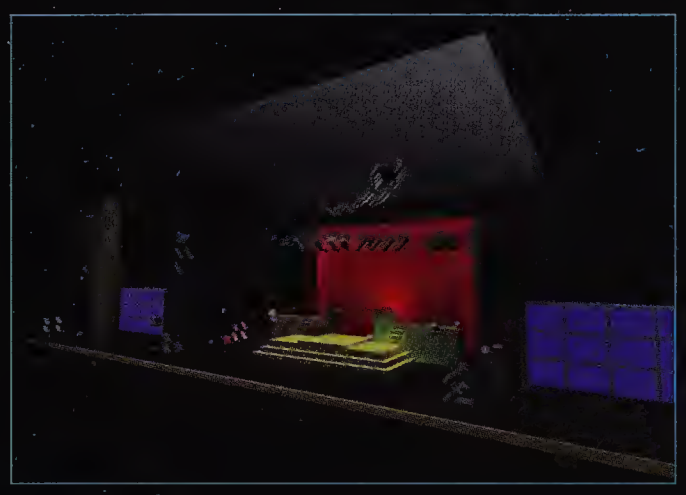
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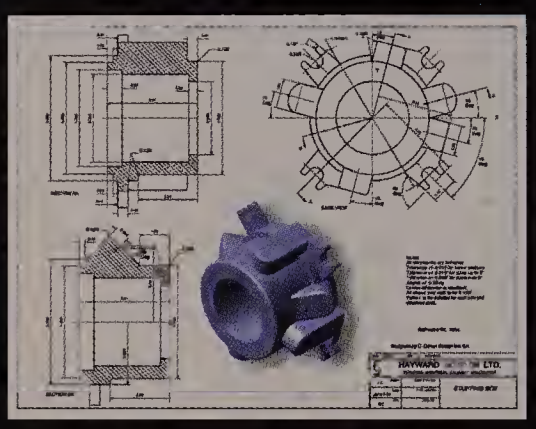
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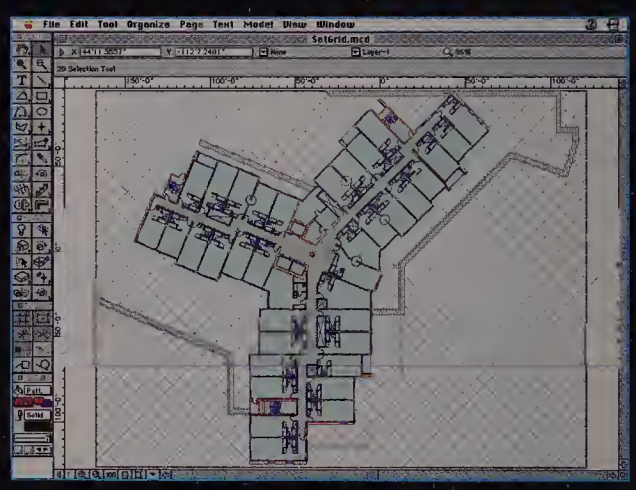
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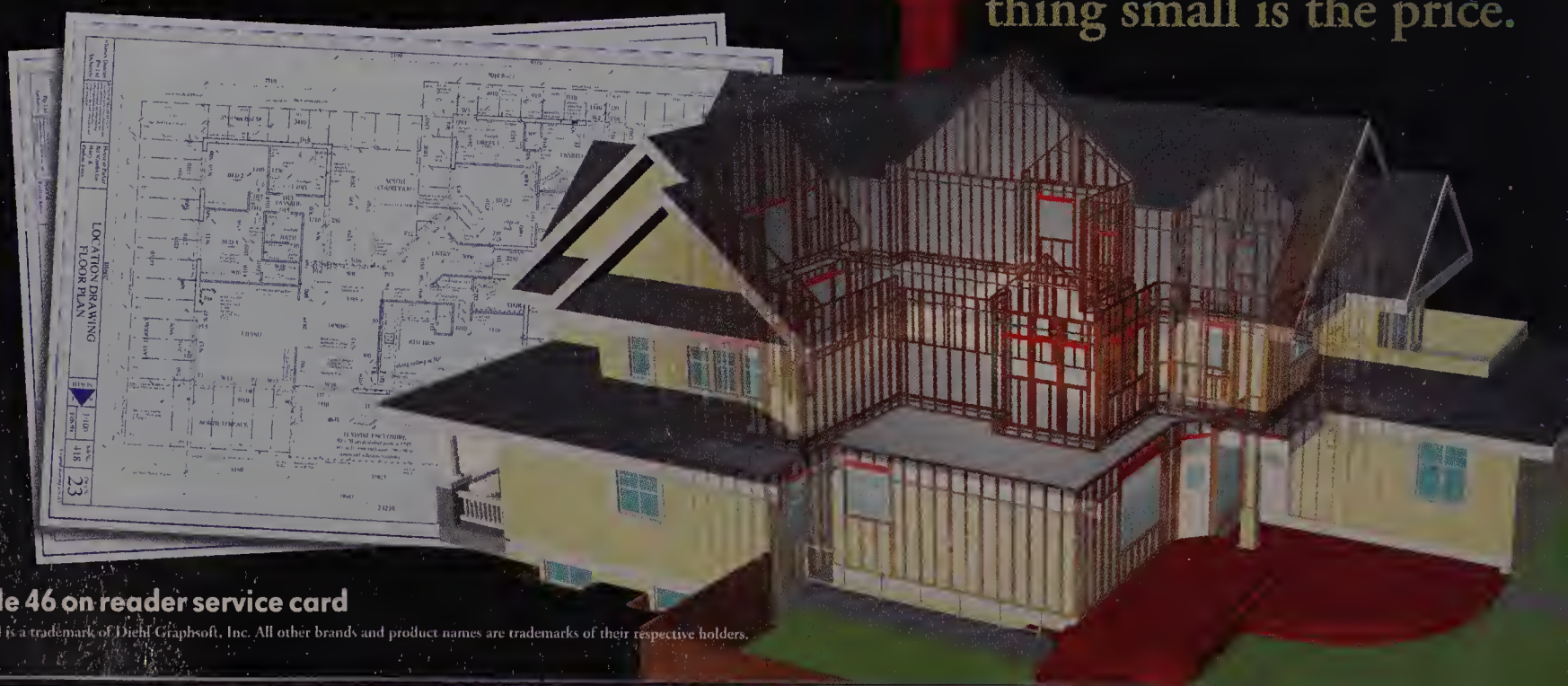
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The Vision Thing

by Andrew Gore

Apple's Choice

FACED WITH TWO UNPLEASANT ALTERNATIVES, APPLE MADE THE RIGHT CHOICE

IF SOMEONE HAD TOLD ME A month ago that I'd be writing the editor in chief's column for *Macworld*, I would have nodded and asked, as nonthreateningly as I could, how long they'd been off their medication.

Of course, rapid and improbable change seems to be the order of the day. Take, for example, Apple's decision to buy back Power Computing's Mac OS license. While not exactly unexpected, this move was nonetheless a shock for Macintosh users who have come to view Power Computing as a singular force for good on the Mac platform. In a few short years, Power Computing has built a reputation for offering innovative products at a reasonable price, and offering them with the unabashed showmanship of a carnival barker.

With Power Computing, the Mac OS wasn't just good, it was the best, no excuses and no apologies. The company did wonders restoring Mac customers' faith in the platform and in their own decisions to stand by their Macs. And while much of this could be attributed to the gonzo marketing the Power Computing name became synonymous with, in a very real sense style became substance as Power Computing helped Mac users realize there was nothing so seriously wrong with their Macs that a little positive PR couldn't help make better.

However, despite all the positives Power Computing brought to the table, there was an unpleasant reality just below the surface that few of us wanted to face. Sometimes I think we Mac advocates are like the managers of a hotel where a skunk has died in the crawl space. Instead of just fessing up to the guests that their rooms smell like something just died because in fact something has, we point out the amenities, the restaurant's five-star menu, or the lovely view. The fact is, Power Computing has done little to expand the market. Worse, due to a series of mistakes made in how Apple constructed the Mac OS licensing program in the first place (see our story in *News*, page 30), Power Computing was taking business away from Apple, business that represented the most profitable part of Mac sales—the high-end—that Apple relies on to pay the bills for Mac OS development. And for all that, Power Computing wasn't making money; and we all know about Apple's economic fortunes over the last year.

This wasn't Power Computing's fault. The company competed effectively based on the rules spelled out by Apple. It was just unfortunate that Apple didn't foresee how the market would evolve, and build a sustainable licensing program. Whatever mistakes were made, in the end Apple was faced with a "Sophie's choice": either continue licensing in a market climate that couldn't support it, or end licensing and face the wrath of customers who were promised choice and were now having it taken away.

I believe Apple made the right decision. Like it or not, Apple is the Mac, and as improbable as it may sound, if the company doesn't make some hard choices to shore up its financial performance now, Apple could easily take the Mac OS down with it. And that, I think we can all agree, would be a very bad thing indeed.

Now under Construction

Which brings me back to, well, me, and the improbable place I find myself in. Many of you reading this, I know, are devotees of *MacUser*; still others are part of *Macworld*'s loyal contingent. The question I imagine both publications' readers have is what exactly is happening to your favorite magazine.

Here's the scoop. After more than a decade of fierce competition for the hearts and minds of Macintosh users everywhere, *Macworld* and *MacUser* have decided to join forces to create the most comprehensive, most authoritative Mac monthly ever. The new magazine, which will be called *Macworld*, combines the best elements of both publications, plus a liberal sprinkling of new ideas, to create the greatest single source of inspiration and information on the Macintosh experience.

What you hold in your hands is the first issue featuring the editorial of both magazines—although rest assured, it is only the beginning. The new *Macworld* is now officially under construction. And I firmly believe that with the combined skills of the two best editorial teams to ever work in the Mac market, the best is yet to come. I just want to thank *Macworld*'s and *MacUser*'s outgoing editors in chief, respectively Adrian Mello and Pamela Pfiffner. Thanks, guys, for helping to create a great foundation for us to build our new *Macworld* on.

An Open Invitation

And that's what we at the new *Macworld* are dedicating ourselves to: building the best publication possible from the considerable assets of two great Macintosh magazines. We know we can't do that alone—to be our best means to serve our audience's interests in the best ways possible. To that end, we want you, our readers, to be our partners as we move forward and start building this great new publication, that just happens to have a familiar name.

To that end, we've set up an e-mail address to which you can send your suggestions and observations. Is there something you've come to depend on in the pages of *Macworld* or *MacUser* that you just can't live without? Let us know. Is there something we haven't done that you always wished we would? Well, now's your chance. Just e-mail us your comments at *visionthing@macworld.com*.

While we may not be able to implement them all, we will give your suggestions serious consideration. In today's fast-evolving Macintosh market, the best way to ride the wave of change is to work together to exploit the opportunities change presents. **m**

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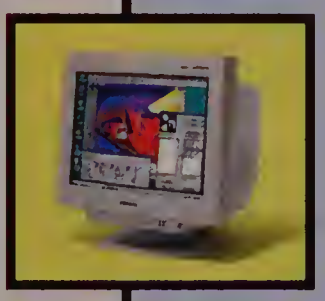
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News

SPECIAL REPORT

Apple Eliminates the Top Clone Vendor

BUYS POWER COMPUTING ASSETS FOR $100 MILLION

by Stephen Beale



Apple Computer drove a spike through the heart of its Mac OS–licensing program when it announced on September 2 that it will acquire the core assets of Power Computing, the company that built the largest Mac-clone business. Apple will exchange $100 million in common stock for Power Computing's Mac OS license and 200,000-name mailing list, and also has the right to retain Power Computing executives involved in direct marketing, distribution, and engineering.

Power Computing will continue as a vendor of Windows PCs, but as of December 31, it will no longer sell Mac systems. Power Computing has also canceled a planned initial public stock offering and halted construction on a new $25 million headquarters near Austin, Texas.

Competition No More The acquisition eliminates Apple's stiffest Mac systems competitor, one that claimed nearly 10 percent of the Mac market in the second quarter of 1997, according to Dataquest. Apple also stands to benefit from Power Computing's expertise in direct marketing and build-to-order manufacturing; Apple currently sells almost all of its systems through dealers, but plans to step up its own direct-marketing efforts.

First Licensee Power Computing was founded in 1993 by PC-industry veteran Stephen Kahng, who anticipated that Apple would soon be open to licensing the Mac OS. In September 1994, Power Computing and Radius became the first Mac OS licensees (Radius later sold its Mac systems business to Umax Computer). Power Computing shipped its first Mac system in May 1995, but it wasn't until spring 1996 that the company began shipping systems in significant volumes, eventually growing to $400 million in annual sales, according to Apple estimates. Power Computing systems consistently outrated competing Apple systems in *Macworld*, *MacUser*, and *MacWeek* reviews.

Power Computing's troubles began early this year when Apple signaled that it would take a hard-line stance with its licensees, seeking to charge considerably higher licensing fees and impose other conditions. On June 18, Power

Computing and Apple reached a tentative agreement that was included in a document filed with the Securities and Exchange Commission (see "Mac OS 8 Ships with No License Deal," *News*, October 1997). But the deal was never finalized, and after Gil Amelio's July 9 resignation as Apple CEO, de facto chief executive Steve Jobs began an effort to eliminate or seriously curtail the licensing program.

Events crested at the August Macworld Expo in Boston, where Power Computing president Joel Kocher tried unsuccessfully to rally attendees into a mass protest of Apple's licensing policies. In mid-August, Kocher and several other senior Power Computing executives resigned over the licensing flap; Kocher wanted to sue Apple for breach of contract, but the company's board of directors chose to continue the negotiations that led to the acquisition.

Now that it has sold its Mac assets to Apple, Power Computing will continue to sell Mac systems until the end of the year. Public Relations Manager Mike Rosenfelt says the systems will ship with Mac OS 8, and that Power Computing will likely offer discounts as it clears inventory. Ironically, Power Computing's demise may mean even more price pressure on Apple, at least in the short term.

Power Computing says it will provide all technical support for hardware and system software until December 31. Beginning January 1, 1998, Apple will be the primary tech-support contact. If your problem is with the Mac OS, Apple tech support will handle it, but if you need hardware or warranty support, Apple will transfer you to Power Computing's tech-support facility.

Additional reporting by HENRY BORTMAN.

NEWS ANALYSIS

Why Apple Pulled the Plug

SERIES OF APPLE, CLONER MISTAKES LED TO UNPROFITABLE SYSTEM

by Galen Gruman

How quickly the dream died. In December 1994, Apple ended its Macintosh monopoly, giving Power Computing and Radius licenses to make their own Macs. With Windows 95 on the horizon and the success of an Intel/Microsoft duopoly clear, Apple's leaders and the industry saw a chance for the Mac market to gain a new level of competitiveness, flexibility, and innovation.

Almost a year later, Apple and IBM put aside a yearlong rivalry and unveiled a partnership with Motorola to create the Common Hardware Reference Platform (CHRP), which would remove Apple's burden of designing Mac hardware and let the entire industry fund the Mac platform's development.

"We believe that an openly licensed Mac OS running on top of an open, industry-standard RISC hardware platform represents a broadside against the reigning Wintel platform, and will play a key role in our ongoing efforts to greatly increase the presence of Macintosh in all markets," then Apple CEO Michael Spindler said during the November 1994 CHRP introduction. "We believe today's announcement is good news for anyone who believes in innovation, competition, and responding to customer needs."

Second Thoughts Fast-forward to summer 1997: After months of complaints by Apple officials that licensing was hurting the company, Apple and the Mac OS licensees hammered out a new agreement that apparently satisfied Apple's financial concerns and let the licensees stay in business. "My position on the clones was that we had to support them," former Apple CEO Gil Amelio told *MacWeek* of the tentative June agreement.

Then Steve Jobs took over Apple in July and sent strong signals that he wanted licensing dead. In a mid-August filing with the Securities and Exchange Commission, Apple said, "The benefits to the company from licensing the Mac OS to third parties may be more than offset by the disadvantages of competing with them. The company is currently in discussions concerning the nature of such licensing arrangements going forward, including whether or not to extend such arrangements."

On September 2, Apple essentially ended the licensing program, buying out its most successful competitor, Power Computing (see story at left). At press time, it appeared that IBM Microelectronics and Motorola Computer Group were preparing to abandon their Mac businesses. Umax Computer was finalizing a deal with Apple that would largely restrict Umax to designing and selling Mac systems in the Far East, and selling or making for Apple sub-$1000 Mac systems, which Apple has been unable to profitably make itself.



KEVIN CANDLAND

Apple withheld support for the CHRP architecture just as the first CHRP systems, such as Motorola's StarMax 6000, were coming to market.

Apple says it will honor current licensing deals, which limit licensees to shipping their current systems. Apple also says it will consider licensing companies that target markets Apple does not want. This seems to mean small or nascent overseas markets, such as China and Korea, not proven markets like the United States.

Essentially, the foray into an open Mac market is over.

continues

Kill or Be Killed How did the promise of fall 1994 devolve into the bitter frustrations that plagued Apple and the licensees in spring and summer 1997?

Simply put, Apple found itself with a do-or-die decision: unable to compete with the licensees' faster, cheaper systems, and bleeding large sums of money due to lost sales (particularly in its high-margin systems), Apple decided it must end licensing or go out of business. "If we continued losing money, we would have disappeared," says Apple marketing chief Guerrino De Luca. "Power [Computing] and the others were not in a position to carry this [market] forward if Apple died."

Late Delivery Eroded Profits In the second quarter of 1997, about a fourth of all Mac systems were sold by companies other than Apple. A huge percentage of those were high-end systems from which Apple traditionally made its real profits. And because Apple usually lagged behind the licensees in introducing new technologies, by the time Apple had new systems out, its target customers had already bought elsewhere.

Although CHRP would allow Mac cloners to pay for their own research and development, Apple was unable to deliver the technology until spring 1997, a year later than originally planned. This kept the Mac makers tightly linked to Apple's own designs and forced them to compete for the same customers, since their products could not be significantly different from Apple's.

By this summer, the situation had only gotten worse for Apple: several market researchers predicted that by the end of 1997, Apple would have less than half the market for new Mac sales.

Technology Missteps Despite Apple's crowing about its technology leadership, its actual technology delivery fell behind that of the licensees. Umax introduced in-line cache first, Power Computing made the first Mac to use the PowerPC 750 and 1:1 backside cache, and Motorola had the first Macs to use the CHRP architecture. Apple instead adopted the new Mach 5 version of the PowerPC 604e and slightly modified its existing systems.

The result was another round of Apple Macs that cost more and ran more slowly than licensees' Macs. Macworld Lab tests this summer showed that Apple's 350MHz Power Mac 9600 was no match for even a 266MHz Motorola StarMax 6000 XL. Apple likely won't match the StarMax 6000's speed until early 1998 when Apple integrates CHRP technology.

Given its technology disadvantage, Apple's refusal to certify competing systems smacked of an effort to hold back competition it knew it could not beat. (Apple has denied such an intent.)

In the early 1990s, Apple systems were routinely trounced in performance by PCs, and that trend began again in the mid-1990s, only to be reversed by Power Computing and the other licensees. Given Apple's inability keep pace with a handful of licensees, it's an open question whether the company will keep pace with the PC industry now that it has eliminated its competition.

A Shrinking Pie Since 1995, Apple's Mac sales had shrunk from about 4.5 million per year to about 1.8 million. The licensees accounted for about 600,000 units in 1997, up from a handful in 1995. Revenues per system also dropped, as Apple was forced to reduce prices to be more competitive.

Power Computing, which accounted for about 10 percent of all Mac sales in 1997's second quarter, went for Apple's jugular earlier this year. The company developed several fast, inexpensive Macs—based on Apple's own technologies—that outperformed anything from Apple. Power Computing also deemphasized its lower-performance systems, which tilted Apple's sales even more to low-profit (or even money-losing) low-end Macs.

Motorola and Umax, which each held about 5 percent of sales in that period, targeted a broader mix of users.

When Apple inaugurated its licensing program, it did not anticipate a declining Mac market or such stiff competition for its core customers. It did not expect management chaos; expensive, spectacular product failures, such as the Copland OS and eWorld; or such disappointing investments as OpenDoc and the Newton, all of which caused Apple to lay off thousands of people and lose more than $1.6 billion over 18 months.

No Expansion? Worse, from Apple's viewpoint, the licensees did little or nothing to expand the Mac market. Instead, they focused on existing Apple customers, advertising in Mac publications almost exclusively. The licensees argued that they needed to get a large-enough share of the market to pay for growth. Ironically, it appears that Apple came to a similar conclusion about its own prospects when it decided to end licensing. The licensees also complained that Apple did not market the Mac to new customers and would not cooperate in joint marketing efforts to new customers.

It is clear that neither Apple nor its licensees were working together to significantly expand the overall Mac market. Compare the lack of cooperation there with the PC market, where Intel subsidizes most PCs (something Motorola and IBM do not do for PowerPC systems) and where Microsoft aggressively markets

continues on page 36

graphics

Display Tablet Lets You Draw on LCD Screen

ALSO SUPPORTS WACOM'S NEW PENTOOLS PLUG-INS

by Cathy Abes

Not content to deliver standard graphics tablets, Wacom (360/750-8882, *www.wacom.com*) has moved into a new dimension by introducing what it calls a video display tablet. Combining a tablet with an LCD panel in one trim, 5.4-pound package, the $2699 PL-300 Display Tablet lets you draw and paint on screen via Wacom's pressure-sensitive eraser pen. The PL-300 consists of a 10.4-inch–diagonal



KEVIN CANDLAND; ARTWORK BY KATHLEEN BLAVETT

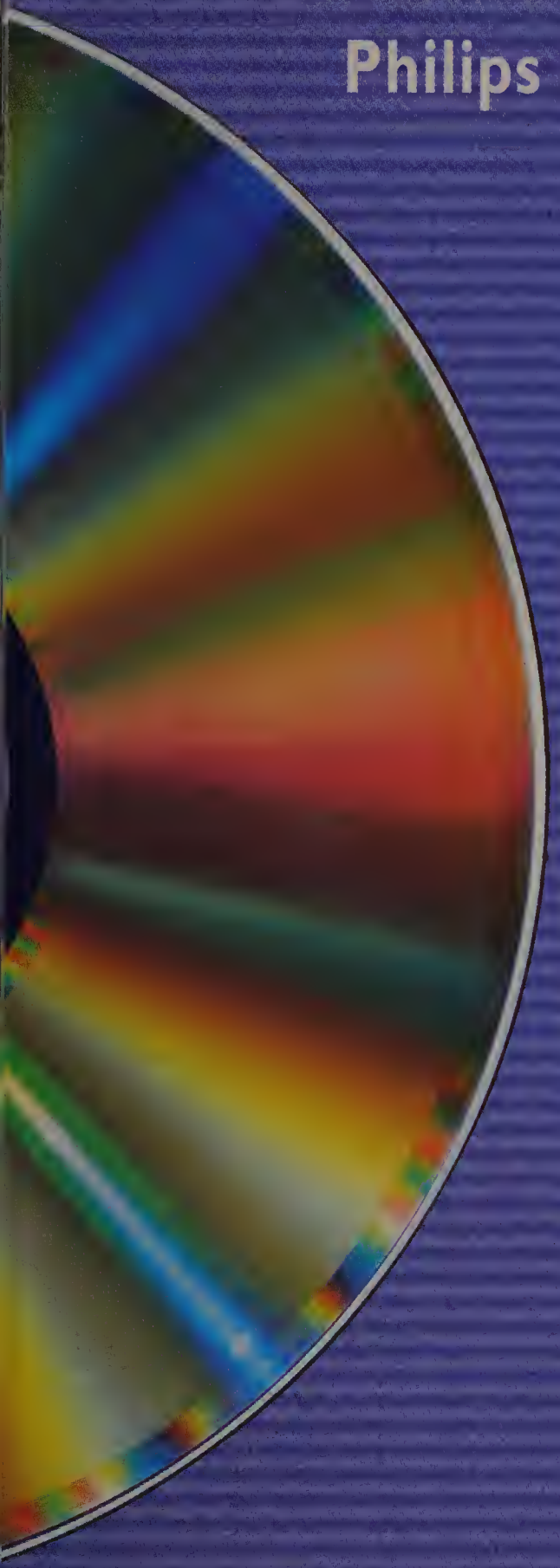
Wacom's PL-300 combines an LCD monitor and graphics tablet.

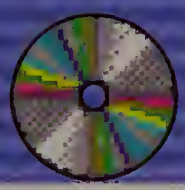
active matrix LCD monitor mounted on top of a Wacom tablet and provides 800-by-600-pixel resolution in 18-bit color depth (256,000 colors). Its dimensions are 11.4 by 10.0 by 1.5 inches.

The new tablet also supports Wacom's PenTools, the company's first software product. A free set of Adobe Photoshop plug-ins available from Wacom's Web site, PenTools is designed to extend the functions of Photoshop and other graphics programs by fully

continues

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exploiting the pressure- and tilt-sensitive capabilities of Wacom's latest pens.

The plug-ins are divided into production (Brush-on Noise, Pen Duster, and Despeckler) and creative tools (Virtual Airbrush, 3D Chisel, and Super Putty).

graphics

3-D Boards at 2-D Prices

ATI, IXMICRO, MATROX OFFER INEXPENSIVE GRAPHICS ACCELERATORS

by Howard Baldwin

Even as Macs become faster, video-card manufacturers are pushing the 3-D graphics envelope with new accelerator boards priced under $1000. ATI Technologies (905/882-2600, *www.atitech.com*), Matrox Graphics (514/969-6000, *www.matrox.com*), IXMicro (408/369-8282, *www.ixmicro.com*), and TechWorks (512/794-8533, *www.techworks.com*) have all announced graphics boards that support Apple's QuickDraw.

ATI's Nexus ATI Technologies announced the Nexus GA, using its own 3D Rage graphics chip, with support for 1920-by-1080-pixel resolution. The base version includes 8MB of windows RAM (WRAM), a type of memory that offers higher bandwidth than the VRAM used in many other graphics boards. Scheduled to ship in September, the Nexus GA is priced at $599; an additional 8MB of memory costs $349.

Three from XMicro IXMicro is offering three boards in its new $659 IX3D product family, all based on the company's TwinTurbo 128-bit 3-D graphics controller. The high-end $659 IX3D Ultimate Rez features 8MB of VRAM and supports up to 1920 by 1080 resolution. The midrange $349 IX3D Pro Rez comes with 4MB of synchronous graphics RAM (SGRAM) and supports resolutions up to 1600 by 1200 pixels; video out is also available as an upgrade option. SGRAM is less costly than VRAM or WRAM but offers faster graphics acceleration than standard RAM chips.

Finally, the $249 IX3D Mac Rocket supports MPEG video and QuickTime playback at resolutions up to 1152 by 870 pixels.

New Millennium Matrox Graphics has introduced its Millennium II graphics accelerator, using its own 64-bit MGA-2164W processor, with support for resolutions up to 1920 by 1200 pixels. Supporting QuickDraw 3D and MPEG-1, the Millennium II costs $269 with 4MB of WRAM and $369 with 8MB of WRAM.

TechWorks Power The $249 Power3D from TechWorks features 4MB of RAM and a Voodoo Graphics 3-D



chip from 3Dfx Interactive. Targeting computer-game users, it supports the standard 14-inch monitor resolution of 640 by 480 pixels. The PCI board does not accelerate 2-D graphics, but includes a pass-through cable that allows use with the Mac's on-board accelerated 2-D video circuitry.

online

Stopping Junk E-Mail

WILL LEGISLATION STEP IN WHERE TECHNOLOGY FAILS?

by Cameron Crotty

Unsolicited commercial e-mail provokes a hostile response from just about every Net citizen. Users and Internet service providers (ISPs) have found it nearly impossible to construct effective technical defenses, so they are turning to the courts and legislation for more-effective weapons. Meanwhile, direct-marketing companies are battling enthusiastically for your right to receive junk e-mail.

Can't Block It Out Ever since junk e-mail appeared, network administrators and technically savvy users have sought ways to eliminate it. But they are handcuffed by the Internet's primary function of encouraging, rather than preventing, the transmission of information.

As part of its optional Preferred Mail services, America Online will automatically block incoming messages from hundreds of Internet domains that are known sources of junk e-mail. But the list grows daily, and AOL admits that it's technically powerless to eliminate the problem. "As soon as we figure something out, they [junk e-mailers] stay five steps ahead of us," says Jill Lesser, AOL's deputy director of law and public affairs.

ISPs that block e-mail also run the risk of interfering with legitimate traffic. Earlier this year, Netcom officials blocked transmissions from the domain of e-mail provider Hotmail because a Hotmail user had flooded Netcom's servers with undeliverable junk e-mail messages. Netcom's action prevented its servers from crashing, but it also angered users who could no longer receive e-mail from Hotmail accounts.

Hotmail has since placed limits on the number of addresses to which users can send a single message, but the larger problem remains. Harris Schwartz, information security administrator at Earthlink, a Southern California ISP, says that some ISPs are still blocking messages from Earthlink in response to previous junk e-mail incidents.

Legal Action Frustrated with the ineffective technical weapons available, some ISPs—including CompuServe, America Online, and Earthlink—have turned to the legal system. While the details of the cases vary, these companies have successfully argued that current methods of sending junk e-mail constitute trespass or "use exceeding consent" on their network resources.

As far as Earthlink cocounsel Pete Wellborn is concerned, it's high noon on the Internet, he's wearing the white hat, and it's time to get it on. "We're at a crossroads," he says. "The Internet can either become a glorified infomercial or a useful tool for communication and education. That's going to depend on what's done with spammers."

But other ISPs are reluctant to call in the lawyers due to the high cost of lawsuits and the general lack of legal precedents on cyberspace activities. The precedents that apply to telephone solicitation or postal junk mail are of little use, since these cases generally involve some form of consumer fraud. Some junk e-mail is fraudulent, but most of it is simply annoying. While you can sue someone for being a nuisance, going

continues

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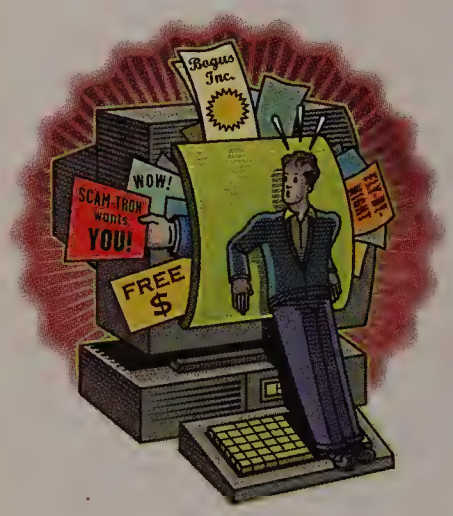
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after a junk e-mailer on this basis "would be a stretch," says Steve Elias, associate publisher of Nolo Press, a California company that publishes books on legal issues.

Whose Law Is It? Congress is now considering several bills that directly address junk e-mail. One, sponsored primarily by Senator Robert Torricelli, D-N.J., would prevent spammers from hijacking e-mail servers and forging e-mail header information to disguise the message's origins or to prevent the recipient from responding. A second bill, sponsored by Senator



Frank Murkowski, R-Alaska, would require that commercial e-mail be specially labeled, presumably making it easier to track or avoid. The most dramatic legislation, proposed by Representative Chris Smith, R-N.J., adds e-mail restrictions to an existing law that makes it illegal to transmit unsolicited commercial faxes.

All of this legislative action, especially the Smith bill, scares the daylights out of ISPs and direct marketers. Few ISPs support the legislation, and those that do give lukewarm lip service—at best—to either the Torricelli or the Murkowski bill. Tony Kelly, director of corporate marketing for PSInet, states that PSInet is opposed to "anything that smacks of censorship on the Internet." Meanwhile, AOL's Lesser says that her company isn't completely happy with any of the proposed legislation, even though AOL helped draft the Torricelli bill.

DMA's View The Direct Marketing Association (DMA) is a trade association for businesses interested in what it terms "database marketing." Not surprisingly, President Bob Wientzen was emphatic in rejecting any legislation, claiming that "everyone will best be served by self-regulation." The DMA currently runs successful telephone- and mail-preference services, through which you can request that your name be removed from the databases of member companies.

This is known as an "opt-out" system, where it's presumed that you want marketing information unless you take action to remove yourself from mailing lists.

Wientzen says the DMA is working on a similar system for e-mail, which he expects to be active this fall. He says the DMA is also talking with the Internet E-Mail Marketing Consortium (IEMMC), which includes some of the best-known junk e-mail distributors.

User Reaction While the computer industry generally opposes junk e-mail legislation, groups of users, such as the Coalition Against Unsolicited Commercial Email (CAUCE), have thrown their weight behind the Smith bill.

CAUCE spokesman Scott Hazen-Muller scoffs at the DMA's proposed opt-out system. "If I spent half an hour, I could probably find ten different remove lists, so what good is one more?"

CAUCE supports "opt-in" marketing methods, by which a consumer must first request information before a business can send anything. Hazen-Muller also questions whether junk e-mailers would even bother to join the DMA. Hazen-Muller also questions whether junk e-mailers would even bother to join the DMA.

NEWS ANALYSIS

"WHY APPLE PULLED THE PLUG"

continued from page 32

Windows (Apple rarely markets the Mac OS).

High Design Costs Apple officials began complaining this spring that the licensees were not paying their "fair share" of Mac development costs. Apple had been charging a license fee of about $50 per Mac system for the Mac OS and another $50 to $75 for use of Apple's hardware designs. (CHRP systems did not require a separate hardware fee.) Apple now believes these fees were too low: "The bet that low licensing fees were sustainable was made based on a growing Mac OS, which turned out not to be true," De Luca says.

After months of negotiations, Apple and the licensees agreed in June to a new Mac OS fee of about $150 to $350 per system, depending on speed. (Compare that with about $50 to $65 for Windows 95 and $90 to $100 for Windows NT.)

The licensees also pay about $5000 for certification by Apple for every system variant they make, in addition to an annual certification fee, according to sources. Despite Apple's protests to the contrary, the licensees were paying Apple real money.

While unhappy with the new fees, the clone makers accepted the June deal. But a few weeks later, Steve Jobs forced out Amelio and backed out of the agreements.

Even after the June agreements, Apple officials complained that the licensing fees were too low, and some hinted that Apple would need $500 or more per system to cover Mac OS and Mac hardware development costs.

Why so much? According to industry analysts, Apple's cost structures are extremely high, given its need to pay for both Mac OS and hardware development. This means the overhead per Mac is more than any licensee would reasonably pay, and is one reason why Apple's Macs are so much costlier than PCs.

The licensing program magnified Apple's historically high costs because Apple could no longer recoup its software development costs through its own Mac sales. By contrast, Microsoft pays for Windows development while Intel pays for most PC motherboard development—and both companies sell about 16 times the volume of products that Apple could hope to. However, IBM and Motorola have paid most of the costs for CHRP, and practically all the costs of the PowerPC CPUs.

Microsoft also makes tremendous revenues from its Office programs, which helps subsidize the company's R&D, much the way Apple's hardware sales have subsidized OS development.

Crown Jewels Although Apple has portrayed the licensing failure as a recent economic decision, the reality is that Apple, or at least parts of it, has never been comfortable with sharing the Mac crown jewels. That, plus the constant sniping by Apple officials on licensing for the last six months, has created a fundamentally negative relationship between Apple and the licensees.

Despite some thaws in the relationship and an occasional positive working arrangement, the basic Apple/licensee partnership was not based on trust or respect, merely on financial opportunity. As the market changed and the conditions for mutual success became more difficult, Apple and the licensees pulled apart rather than pulled together. The result was that when the Mac market's economics went south, licensing became doomed to failure.

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* Performance statistics based on comparison to C600 without CacheDoubler. The C-series CacheDoubler upgrade card for installed base will be available in September '97.

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industry

A New Era for Mac Pubs

IDG AND ZIFF-DAVIS MERGE MACWORLD, MACWEEK, MACUSER

by Carol Person

A new era dawned in Macintosh publishing when International Data Group (IDG), parent company of *Macworld*, and Ziff-Davis, publisher of *MacWeek* and *MacUser*, agreed in August to form a joint venture called Mac Publishing that will consolidate the three magazines. The new company will publish *MacWeek* in its current form and *Macworld* as a monthly that incorporates *MacUser*. The changes became effective with this issue of *Macworld*. For several months, *Macworld* will feature a *MacUser* insert in addition to standard *Macworld* content. During that time, the merged staff will work on a redesign that uses content from both magazines. *MacUser* subscribers will automatically receive *Macworld*.

Colin Crawford, formerly president and CEO of Macworld Communications, holds the same post in Mac Publishing. The new venture is led by a board of directors consisting of Crawford and two representatives each from IDG and Ziff-Davis. The company's operations are headquartered in San Francisco.

Crawford named former *MacUser* editor Andrew Gore as editor in chief of *Macworld* to replace Adrian Mello, who resigned after the joint venture was announced.

Crawford also named *Macworld* coexecutive editor Galen Gruman as editor.

Mello, who had served as editor in chief of *Macworld* since 1992, announced his resignation in a message sent to the magazine's editorial employees:

"I write to let you know that I am resigning as editor in chief. I feel like I've completed my work at *Macworld* and current conditions make it the logical time for me to move on to the next phase in my career.

"Throughout my time at *Macworld* I have always had the deepest respect for the staff and contributors. A few of you who have been here as long as I will testify that it has always been a special place with exceptional people. I feel fortunate to have worked over the years with an editorial staff that was uniformly committed to quality, integrity, consideration of others, professionalism, and general excellence. I know that along the way, all of you have given many extra hours of effort to ensure that *Macworld* was the best product it could be. Without you, none of my personal success or the company's success would have been possible.

"*Macworld* editorial's designers, administrative staff, editors, online staff, copy editors, lab staff, contributors, art directors, and production editors are the best in the business and I am proud of the work that we have completed together. *Macworld* has been the standard of excellence among all computer publications precisely because we have always tried to be a great magazine, not just a great computer magazine.

"I especially appreciate the strength of character within our community, which has meant that *Macworld* has always been a place of mutual care and consideration. The greatest gift you could give me is to continue in this same spirit of devotion to quality and concern for others. I thank you all for everything you have done to contribute to my fulfillment and I wish you all the best."

Macs for the Gallery

NEW BOOK CHRONICLES APPLE INDUSTRIAL DESIGNS

Mac fanatics know that Apple has produced the most stylish computers ever sold—most recently its limited-edition 20th-anniversary Mac (see "The 20th Anniversary Macintosh," March 1997). But few realize that some of Apple's most innovative industrial designs never made it to market.



RICK ENGLISH

***AppleDesign*, a new book by Paul Kunkel with photographs by Rick English, chronicles the evolution of the Apple Industrial Design Group and the award-winning machines it has developed, including many that never got past the prototype stage. Examples include the Paladin, an all-in-one computer, telephone, fax, and answering machine; and the PenMac (shown above), a handheld, stylus-controlled computer with a CD-ROM drive and infrared data terminal.**

Other noteworthy designs include the Nautilus series, subnotebooks wrapped in leather and brushed or polished metal, and the Domesticated Mac, an update of the discontinued Color Classic. *AppleDesign* is available for $50 from Graphis (212/532-9387, *www.graphis.com*).—ANDREA DUDROW

systems

Be Bops On with New Software

RUNS BEOS ON INTEL AS NEW APPS ARE UNVEILED

by Howard Baldwin

As Apple celebrates strong sales of Mac OS 8, Be (650/462-4100, *www.be.com*), developer of one of the *other* operating systems for PowerPC CPUs, continues to bop along with new releases of its software.

In July, the company shipped its BeOS Preview Release for PowerPC, followed by an update that adds AppleTalk printing and improves video drivers and IDE support. Hedging its processor bets, Be also demonstrated its BeOS running on a dual–Pentium II PC at an August developer conference

continues

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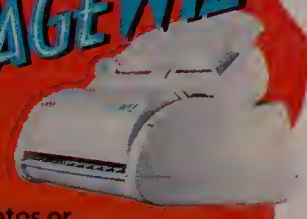


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Media WATCH

BY CATHY ABES

Pushing Photoshop's Buttons

Extensis (503/274-2020, *www.extensis.com*) is adding two new tools and several enhancements to its Photoshop plug-in collection, PhotoTools 2.0, due by the end of October at a street price of $130. PhotoButton lets Web and multimedia designers create multiple buttons with a variety of effects, including bevels, convex and concave centers, framed edges, and adjustable lighting. You can build vertical or horizontal bars of up to 24 buttons, as well as a matrix of buttons with up to 64 entries. PhotoCastShadow lets you apply drop shadows and perspective shadows; you can also generate a shadow without the selection or invert a shadow to simulate embossing and other effects.

Enhanced tools include PhotoText, which now lets you save text blocks and define style sheets; and PhotoGlow, PhotoEmboss, and PhotoBevel, which have added real-time previews, multiple undos, and background processing.

Creator 2 Goes Mainstream

Aiming to fill what it sees as a void left by page-layout giant QuarkXPress, Multi-Ad Services (309/692-1530, *www.multi-ad.com*) has revamped Multi-Ad Creator and renamed it Creator 2. Although the new version is still geared to designers of ads and promotional materials, the company is betting that its multiple-page support, document-customization features, and full scriptability will attract many Quark users.

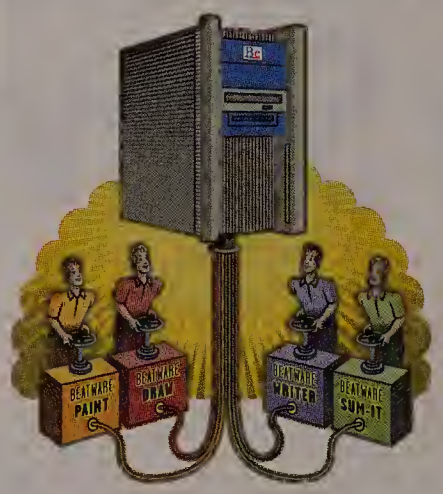
Creator 2 lets you specify two-page spreads, multiple master pages, and individually sized pages within a document. Its Style Models let you apply multiple style settings within the same style sheet. The new Containment tool lets you individually position and edit elements within containers without affecting anything else on the page. In addition to PostScript drawing tools, the program provides trapping, color separations, and ColorSync 2 support. Due in late September, the program will retail for $995, with an expected street price of $649.

Graphics Applications Get ICE'd

Version 4 of Integrated Computing Engines' (888/423-8447, *www.iced.com*) $8999 ICEfx video-effects accelerator, due in September, adds 14 new effects to its repertoire while reducing its hardware needs to a single PCI slot. The board also extends application support to include the Ultimatte blue-screen compositing tool and Illuminaire video-compositing software from Discreet Logic. Also available as a separate software option is the $995 ICE'd Cyclonist, an accelerated version of DigiEffects' organic particle-animation plug-in. Newly optimized DigiEffects filters include Videolook, Fogbank, Starfield, Chaotic Noise, and Chaotic Rainbow.

held on the eve of Macworld Expo in Boston.

The company promises to release R2 (for "second public release") versions of the OS for both platforms in January, putting the BeOS on comput-



ers that run Mac OS, Windows 95, and Windows NT. The R2 versions will feature numerous multimedia enhancements, including support for MPEG, QuickTime, JPEG, 3-D graphics, and live video, according to spokesman Mark Gonzales.

Be's Intel port produced a surprising result for the company—Be engineers claim that they found the PC platform to be faster and more stable than Apple's Power Mac designs. These engineers say they expect Intel hardware to become the BeOS platform of choice.

Be Applications Meanwhile, several small developers have introduced software for the fledgling market. BeatWare (650/322-7290, *www.beatware.com*) is shipping two suites: Be Basics, a $69 package that includes word processing and spreadsheet software, and Be Studio, a $99 paint and draw combo. The paint program takes advantage of the multithreaded capabilities of the BeOS, letting you open multiple copies of the same image and apply different filters to each.

Both suites include a free upgrade to version 2.0, which is planned for next spring. BeatWare also offers a BeOS programming tool called AppSketcher that works in conjunction with Metrowerks CodeWarrior DR3.

Be lists some 200 packages for its Preview Release or Advanced Access Preview Release (AAPR), an early version of the OS that shipped only to developers. These include development tools, spreadsheets and other business productivity applications, and even an Amiga emulator.

Applications written for previous versions of the BeOS, including AAPR, are not compatible with the Preview Release. However, Gonzales says, most of the older applications have been ported to the updated version.

multimedia

Completing the QTVR Panorama

SOFTWARE LETS YOU CREATE OBJECT MOVIES

by Stephen Beale

The first generation of mass-market QuickTime VR (QTVR) authoring programs—PictureWorks' Spin Panorama, Panimation's Nodester, and Live Picture's PhotoVista—let you create virtual-reality panoramas (see *Reviews*, in this issue).

Now, two of these vendors, PictureWorks Technology (510/855-2001, *www.pictureworks.com*) and Panimation (407/599-9697, *www.panimation.com*), have completed the QTVR picture by introducing software that lets you create QTVR object movies. Apple Computer (408/996-1010, *www.apple.com*), which invented QuickTime

continues

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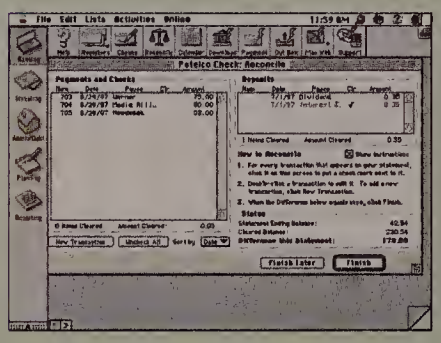
BY WENDY SHARP

Quicken's annual upgrades, Quicken Deluxe 98 and Quicken Basic 98, are on the way from Intuit (650/944-6000, *www.intuit.com*), and users have much to be excited about. A long list of new features and seemingly minor enhancements adds up to some major improvements.

Crowd Pleasers Minor tweaks, such as longer category and account names, are immediately satisfying. Other crowd pleasers include Smart Reconcile, which saves past reconcile statements—making it easier to fix mistakes—and direct report editing, which lets you make content, layout, and font changes from within a report. You can click on the Register Shortcuts button from within the register to schedule transactions and instantly create relevant reports. Other improvements include automatic file backups, a new register account bar, and an improved online-banking window.

Deluxe Features Quicken Deluxe users will get QuickEntry, a tiny (less than 800K) application that lets you quickly record daily transactions. It's essentially an empty register list: any data you type in is added to your account file. A tip from Intuit: cleaning out your QuickFill list makes QuickEntry open faster.

Deluxe also lets Internet users link to Web sites offering mortgage, tax, investment, insurance, and financial-planning information. For example, a click on the insurance task takes you to InsureMarket, which quotes comparisons from major insurance companies. Of course, you can access the same sites without Quicken, so while potentially handy, it's not worth upgrading for. Other Deluxe features include a tax-deduction finder, a mutual-fund finder, and a password-protectable emergency-records keeper, which helps you collect and store personal information, such as bank-account numbers and the location of your will.



The improved reconcile window gives clear directions for those new to reconciliations.

Both versions are memory-hungry. System 7 users will need 8MB of RAM to run Basic, while Deluxe will take 12MB. Mac OS 8 users need a hefty 12MB for Basic, 16MB for Deluxe.

Due in October, Quicken Deluxe 98 will retail for $59.95; current owners will get a $20 rebate. Quicken Basic 98 will cost $39.95, with a $10 upgrade rebate. Most users should find Quicken Basic's interface enhancements appealing. Though Deluxe's more advanced features are less useful, QuickEntry alone may be worth the extra $10 for those who upgrade. New users, on the other hand, should save the $20 and go the Basic route.

VR, is also joining the fray with a forthcoming QTVR authoring suite.

A QTVR panorama places you in the middle of a virtual environment. In contrast, a QTVR object movie lets you view an object from multiple angles, as if you were holding it in your hand. You can save the objects as stand-alone movies or, with the proper software, embed them within a QTVR panorama.

Common Features To produce an object movie, you first photograph the object from



different sides, generally placing it on a turntable or gantry for precise positioning. PictureWorks' Spin PhotoObject and Panimation's Widgetizer then combine these multiple images into a single QTVR object. Both programs include features that let you adjust the alignment of individual frames within the object movie. You can also use the programs' respective overlay features to see preceding frames.

In addition to producing QTVR object movies, Spin PhotoObject can save objects for continuous playback as animated GIF or QuickTime MOV files. Widgetizer is limited to saving QTVR files.

Spin PhotoObject was scheduled to ship September 1 for $150, with a $100 introductory price in effect until September 30. Widgetizer is scheduled to ship in early fall at a price to be determined; Panimation executive vice president Walter Neals says it will cost no more than $170.

Apple's Entry Neither Spin PhotoObject nor Widgetizer can embed an object movie in a panorama. For that, you'll need Apple's forthcoming QuickTime VR Authoring Studio, which will provide all the components needed to create multinode QTVR panoramas that include object movies along with links to other panoramas.

Apple already offers a QuickTime VR Authoring Tools Suite that can create multinode QTVR panoramas (see aforementioned review). However, it uses a cumbersome command-line interface more oriented toward developers than ordinary users. The forthcoming QTVR studio will feature a more intuitive Macintosh interface.

Two modules in the studio, Panorama Stitcher and Panorama Maker, function much like Panimation's Nodester and PictureWorks' Spin Panorama. Panorama Stitcher lets you combine multiple images into a seamless panorama, while Panorama Maker converts panoramas—either photographs or synthetic 3-D imagery—into QTVR movies.

The Object Maker module, similar to Widgetizer and Spin PhotoObject, creates object movies from a series of still images. Scene Maker lets you combine multiple QTVR panoramas and object movies into full-fledged multinode QTVR files.

The software also includes a project manager that lets you track media elements to be used in the panoramas. Apple plans to ship the software in the fourth quarter but has not announced pricing. Panimation is considering a similar product for early-1998 release that will combine Nodester and Widgetizer with multinode QTVR authoring software. Neals says that the software is likely to sell for $400 to $500.

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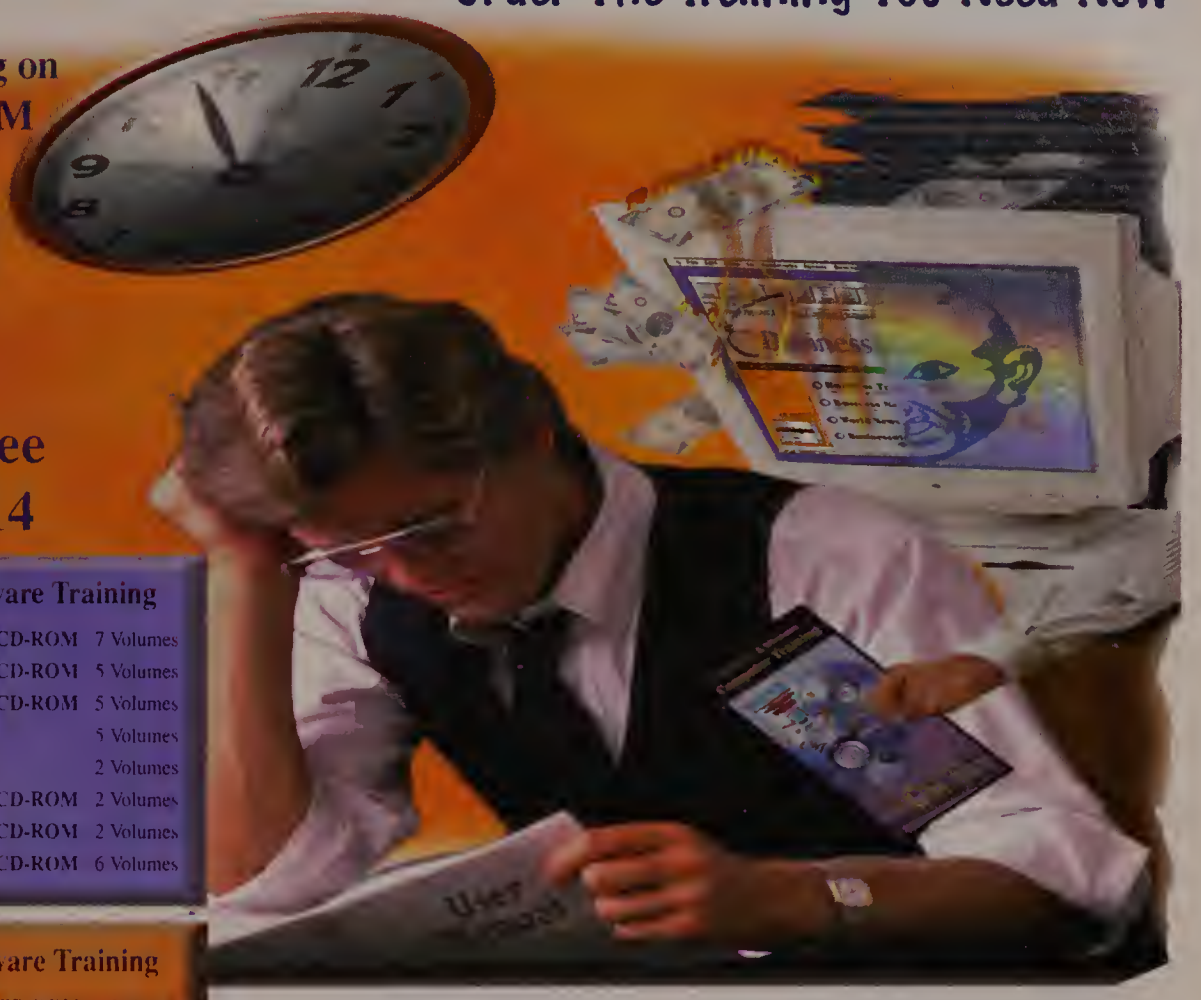
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New Cameras Make Movies

CANON AND HITACHI COMBINE STILL IMAGING AND DIGITAL VIDEO

by Stephen Beale

Digital video and digital photography could soon be on a collision course, thanks to recently announced camcorders from Canon (516/328-5904, *www.usa.canon.com*) and Hitachi (770/279-5600, *www.hitachi.com*) that double as digital cameras.

Digital Camcorder Canon's $2500 Optura, scheduled to ship in October, stores images at 720-by-480-pixel resolution in one of three modes: a still-photo mode, a normal movie mode for playback on standard TV sets, and a progressive-scan movie mode that captures a full 30 frames per second of noninterlaced video. The latter mode, in addition to producing digital-video clips, can be used in the same manner as a high-speed motor drive to capture a rapid succession of still images.

The camera stores video on standard mini-DV tape cassettes, available in 30- and 60-minute capacities for about $7 and $11, respectively. It also includes an IEEE 1394 FireWire interface for fast file transfer to your Mac. The base package does not include a flash, but the camera works with any Canon EOS Speedlite flash.

The Optura has several features designed to enhance image quality, including an optical stabilization system that automatically shifts the image to compensate for shaking, and a FlexiZone autofocus function that lets you choose the area of the image on which to focus. The camera also offers 14× optical zoom and 35× digital zoom; the latter feature uses interpolation to boost the apparent size of the image. A $200 light-box option converts the camera into a slide scanner.



ROBERT PERRY

Canon's Optura uses a FireWire interface for fast data transfer.

MPEG Camera Hitachi, which introduced a Windows version of its $2400 MP-EG1A MPEG camera in May, recently announced a $300 Mac interface kit consisting of a SCSI adapter, file-transfer software, and a special release of Apple's QuickTime MPEG extension. True to its name, the camera stores video directly in the MPEG format using a built-in MPEG-1 encoder/decoder chip. It features a removable 260MB PC Card hard drive capable of storing 20 minutes of MPEG video, 3000 still JPEG images, 1000 still images with voice annotations, or 4 hours of MPEG audio. You can transfer images using the SCSI adapter or, if you have a PowerBook, through the PC Card. An AV port lets you display images on a TV set. Maximum resolution is 704 by 480 pixels. The camera offers a 3× optical zoom and a 2× digital zoom.

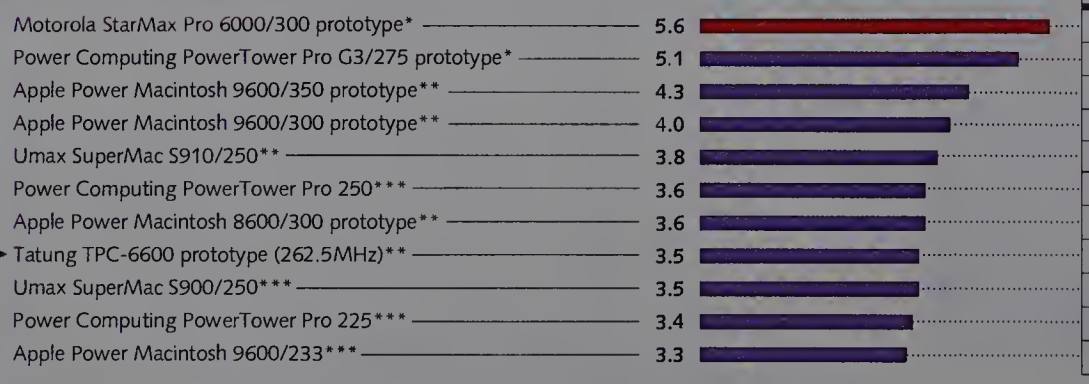
The MP-EG1A is powered by two rechargeable lithium-ion batteries, good for 40 minutes of operation between charges. A charger and an AC adapter are included. Other features include a wireless remote, a built-in microphone and speaker, and a 1.8-inch color LCD for image preview and file management.

Tatung CHRP Mac Keeps Pace

The second company to announce a CHRP system, Tatung Information Systems of Taiwan, has managed to deliver performance that keeps pace with similar systems. Despite the TPC-6600's faster system bus (75MHz, versus 50MHz) and faster CPU, the TPC-6600 running at 262.5MHz is only marginally faster than a 250MHz Umax system because the Umax system (like most current Mac systems) uses a fast video card. However, the TPC-6600 nearly matches Apple's new 300MHz Power Mac 8600/300, which has slow video circuitry and a slower (50MHz) system bus. For more on the TPC-6600, see "Tatung Shows First 75MHz System Bus," *News*, August 1997.

Macworld LAB TEST

Best overall performance. Longer bars are better. Bold indicates best result in a specific test. ► New system. An Apple Power Macintosh 7100/80 has a SpeedMark score of 1.0.



	CPU	FPU	Disk	Video	Star Rating
Motorola StarMax Pro 6000/300 prototype*	**6.2**	**5.4**	**3.9**	**9.8**	not shipping
Power Computing PowerTower Pro G3/275 prototype*	5.9	5.2	2.8	9.4	not shipping
Apple Power Macintosh 9600/350 prototype**	4.7	4.7	2.6	7.7	not shipping
Apple Power Macintosh 9600/300 prototype**	4.3	4.3	2.5	7.1	not shipping
Umax SuperMac S910/250**	3.9	3.7	3.1	7.2	not shipping
Power Computing PowerTower Pro 250***	3.9	3.8	2.5	7.6	★★★/6.2
Apple Power Macintosh 8600/300 prototype**	4.1	4.1	2.3	3.9	not shipping
► Tatung TPC-6600 prototype (262.5MHz)**	3.9	3.9	2.4	4.4	not shipping
Umax SuperMac S900/250***	3.8	3.7	2.5	7.3	★★★/6.3
Power Computing PowerTower Pro 225***	3.6	3.4	2.3	7.2	★★★/6.4
Apple Power Macintosh 9600/233***	3.5	3.4	2.3	6.9	★★★/6.6

*Uses PowerPC 750. **Uses new Mach 5 PowerPC 604e. ***Uses previous PowerPC 604e.

Behind Our Tests For detailed information on our systems benchmarks, see *Mac Superguide*, September 1997.—Macworld Lab testing supervised by Mark Hurlow

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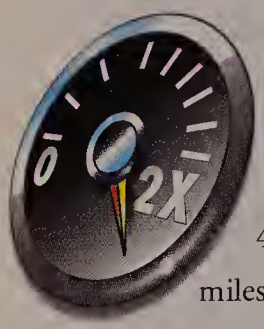
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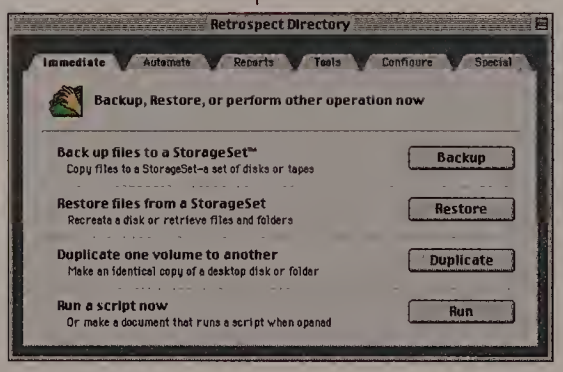
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Retrospect is totally compatible with the new Mac OS 8, so upgrading won't put you behind the eight-ball.

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Retrospect's interface received recognition from Apple for Human Interface Design Excellence.

Speaking of smooth, now you can get backup status by email or pager. You, too, can have your beeper go off at a dinner party just like the doctor next to you.

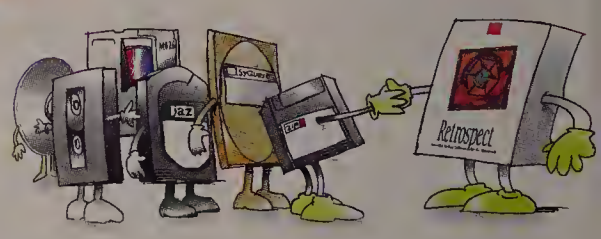
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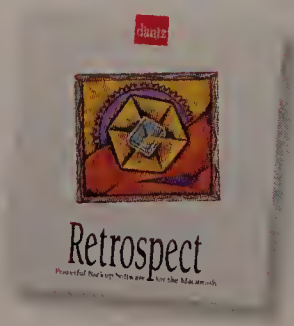


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Circle 26 on reader service card

New Products

THE LATEST MACINTOSH RELEASES

Edited by Keith Mitchell

COMMUNICATIONS

E-mail, Anyone?

QuickMail users, take note: CE Software (515/221-1801, *www.cesoft.com*) has released QuickMail Pro Server, an Internet server that replaces the company's proprietary LAN-based server. The server supports POP and IMAP protocols and includes mailing-list capabilities. Pricing ranges from $100 for 5 users to $500 for 100 users. Site licenses are also available.

DISPLAY

Enjoy the View

Is a monitor in your future? Here are some new ones to check out.

• Panasonic's (201/348-7000, *www.panasonic.com*) $599 S70, 17-inch monitor has a 0.27mm dot pitch, a 16-inch viewable area, and resolution of up to 1280 by 1024 pixels. The $299 E50 is a 15-inch monitor with a 0.27mm dot pitch, a 13.7-inch viewable area, and up to 1024-by-768-pixel resolution.

• The SuperView Pro 260 is a $779, 17-inch monitor from Tele video (408/954-8333, *www.televideoinc.com*). It has a 0.25mm dot pitch, a 16-inch viewable area, and a maximum resolution of 1600 by 1200 pixels.

GRAPHICS

Digital Photos to Go

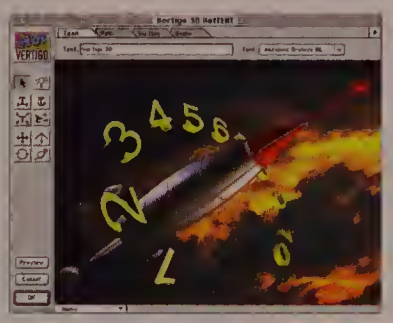
Weighing in at 5.6 ounces, the $399 DX-5 digital camera from Fuji (914/789-8100, *www.fujifilm.com*) includes an automatic flash, a 2MB SmartMedia card that can store up to 30 images, and image-editing software. The camera takes 24-bit color images at maximum resolution of 640 by 480 pixels.

Scanning the Horizon

High-resolution scanning comes in a flatbed package with the Quato X-finity from Spark (847/998-6640, *www.quato.com*). The $3595 scanner delivers an optical resolution of 1200 by 2400 dpi at 42 bits per pixel.

Fear of Sights

Take your Adobe Photoshop text to new heights with Vertigo 3D HotText from Vertigo Technology (604/684-2113, *www.vertigo3d.com*). The $199 Photoshop plug-in lets you convert 2-D text to 3-D, align it to customized 3-D paths, and apply lighting and surface effects. You can create your own paths or use the 20



Vertigo 3D HotText

editable ones that come with the product. Using the plug-in's graphics tools, you can reposition, tilt, rotate, and change the thickness of selected text. The program also works with bitmapped images imported into Adobe Illustrator.

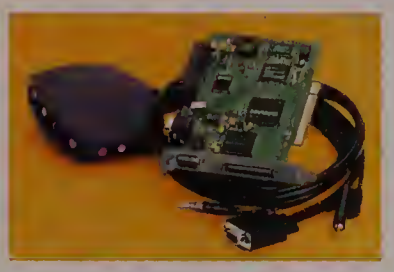
MULTIMEDIA

Crank It Up

Is the neighborhood getting too quiet? Panasonic's (201/348-7000, *www.panasonic.com*) $99 EAB MPC250 external speaker system lets you boom the bass with a 10-watt subwoofer and two 10-watt, two-way speakers.

Stung by Multimedia

Iomega (801/778-1000, *www.iomega.com*) hopes consumers will swarm to its new Buz multimedia producer. The device is a combination PCI video-capture card; Ultra SCSI controller; and software suite that lets



Buz Box and Ultra SCSI

you store movies, photos, and music from camcorders, DVD-ROMs, digital cameras, VCRs, and laser discs on your computer. An external Buz box plugs into the video card and includes in and out connections for S-Video, composite video, and stereo audio. Buz comes with a suite of software for manipulating audio, video, and pictures. The system is scheduled to ship in the fourth quarter of 1997 for an estimated $200.

Hot, Hot, Hot

For really burning video, Artbeats Software (541/863-4429, *www.artbeats.com*) has released ReelFire and ReelExplosions video special-effects CD-ROMs. ReelFire includes effects such as fireworks, smoke, torches, and flames. ReelExplosions includes ground explosions, zero-gravity explosions, and fireballs. The sequences are stored as 720-by-486-pixel QuickTime movies and can be used with any video-editing software that imports QuickTime files. Each costs $499.

ONLINE

Your World on the Web

Now you can show your surroundings to the rest of the world with SiteCam 1.0 from Rearden Technology (415/550-7573, *www.rearden.com*), maker of the popular shareware MacWebCam. The $129 program streams images over the Internet from a video camera tethered to your computer. The software supports still images and live video, automated image archiving, and time stamping, and can be used with any QuickTime-compliant video source. The video frame rate scales to the available bandwidth for optimal streaming. Current users of MacWebCam can upgrade for $75.

Object-Oriented Authoring

Getting interactivity, sound, and animation on your Web site usually requires scripting. But mBed Interactor 1.0 from mBed Software (415/778-0930, *www.mbed.com*) lets you create interactive, media-rich Web sites using building blocks called mBed Players. You can create interactive buttons, slider controls, styled text, and animation effects. The $99 program can also play back RealAudio streams synchronized to animation on your Web site.

SYSTEMS

Keep Macs in Schools

Don't let your school replace its Macs with PCs. Tell it about Orange Micro's (714/779-2772, *www.orangemicro.com*) OrangePC 530 Windows-compatibility card, designed for the education-only Power Macintosh 5400 and 5500. The 7-inch card includes an upgradable 166MHz Pentium processor; 8MB of RAM (expandable to 128MB); and serial, parallel, game, and audio-in and -out ports. A base configuration costs $861. m

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Reviews

PowerBook 2400c

SUBNOTEBOOK IS FAST AND CONVENIENT BUT NEEDS BETTER KEYBOARD



ROBERT PERRY

AS A LONGTIME POWERBOOK Duo user, I was eager to try out the PowerBook 2400c, Apple's 4.3-pound entry in the subnotebook category. Like the Duos, the 2400c stays trim by sacrificing an internal floppy drive, though it does sport a compact external floppy drive that can be left at the office when you're traveling. It also lacks an internal CD-ROM drive, a standard feature on the much larger and heavier PowerBook 1400 and 3400c models.

The main circuitry in the 2400c—a 180MHz 603ev PowerPC processor with 256K cache—proves to be nearly as speedy as the 180MHz version of the 3400c (see "PowerBook 2400c—Solid Subnotebook Performance"). Unlike with the 3400c, the 2400c's processor resides on a daughterboard, allowing for future CPU upgrades. Newer Technology (316/943-0222, *www.newertech.com*) plans upgrades using the new PowerPC 750 CPU running at 233MHz or 250MHz, depending on how much heat the CPU generates—the 2400c also lacks the 3400c's built-in fan.

The only other provision for internal expansion comes in the form of a slot for an industry-standard JEDEC memory card. Apple says the most RAM you can add is 32MB, bringing the total RAM to 48MB with the 16MB soldered on the motherboard. The actual limit is 64MB (for a total of 80MB), but because of a design mix-up, the 64MB card must be specially made for the 2400c (it must have two swapped wires, compared with a true JEDEC card).

All the Standard Ports

The PowerBook 2400c's slim AC adapter uses a thin, two-wire AC power cord; all currently shipping PowerBooks now use AC power supplies that are also compatible with those of the older Duos. The lithium ion battery is specific to the 2400c, however. VST (508/263-9700, *www.vsttech.com*) plans an external battery charger for the 2400c.

Unlike the Duo, which offered only minimal ports unless you plugged into an accessory dock, the 2400c includes all the standard Mac ports: ADB, SCSI (via an HDI-30 square connector as in other PowerBooks), a single serial port, stereo audio in and out, video out, infrared (with IRTalk for Apple devices, and 1Mbit IRDA when appropriate drivers are available), and two PC Card slots. The

REAL PRODUCTS REAL RATINGS
Reviews you can trust: Unlike other publications, Macworld rates only final shipping products, not prototypes. What we review is what you can actually buy.
Outstanding ★★★★★= 9.0–10.0 Very Good ★★★★= 7.0–8.9 Good ★★★= 5.0–6.9 Flawed ★★= 3.0–4.9 Unacceptable ★= 0–2.9

recessed SCSI and serial-port connectors cause some difficulty: L-shaped SCSI adapters won't fit, and a few serial-port plugs with oversize moldings—such as Farallon's single phone-plug LocalTalk adapter—barely fit. More-conventional cables, including Apple's SCSI cables and all common serial-port cables, fit without difficulty. (Newer Technology is planning to release a simple $199 BookEndz dock, which connects to the back and brings out all the ports, and will also accept all the problem plugs.)

The 2400c features a small, VGA-style video-out port that's standard on PCs; Apple supplies an adapter to accommodate the larger Power Mac–standard video connector. The built-in 10.4-inch active matrix LCD screen displays thousands of colors with a resolution of 800 by 600 pixels; it's sharp, bright, and quite legible despite its relatively small size-to-pixel ratio.

The PowerBook 2400c doesn't offer a wide range of external display resolutions: thousands of colors at 640 by 480 or 800 by 600 pixels, but only 256 colors at 832 by 624 or 1024 by 768 pixels. On the other hand, a choice of refresh rates means you avoid the problem of flicker. As with the 3400, the 2400c's video circuit supports either single or mirrored display, although mirror mode runs only in 80 by 600 pixels; consequently, the 2400c can drive older 640-by-480-pixel projection panels only with its LCD turned off.

The 2400c's audio-input plug is a standard stereo miniplug that takes line-level signals. Since the microphone is once again badly placed near the keyboard and spinning hard drive (the top of the screen would be a little better), you'll need to connect an external microphone to achieve a decent-sounding recording. Although Apple says that its Omni microphone (included with desktop systems) will work with the 2400c, the output level is too low for satisfactory results. The simplest solution is MicNotePad Lite from Nirvana Research (*moof.com/nirvana/*), an audio recording program that includes an input-boost feature that is adequate for many standard microphones. Otherwise you'll have to build an adapter for the Apple PlainTalk microphone (see "The All-Purpose PowerBook," *PowerBook Notes*, *Macworld*, January 1996) so it can work with the 2400c.

Lacking the 3400c's internal PCI-style slot, the 2400c offers no built-in modem or Ethernet, although you can add them via a PC Card; 3400c-compatible cards should work, but check with each product's vendor before buying one. Like the 3400c, the 2400c supports Zoom video through the lower PC Card slot.

One standard PowerBook "port" is missing from the 2400's lineup, however—a security slot for locking the computer to a table or desk.

Keyboard Contortions

The 2400c was originally designed for the Japanese market, where few people touch-type. As a result, the 2400's tiny keyboard poses some ergonomic challenges. At 87 percent of standard size, it is distinctly smaller than the Duo's, which is only 5 percent smaller than a standard-size keyboard.

I've never had trouble switching between a Duo and a desktop keyboard, but the 2400c is another matter. Although I am able to touch-type on the 2400c, my fingers feel much happier on a Duo keyboard. Your experience may vary, of course; two-finger typists seem to have less trouble with crowded keys. Posing another usability quirk, the keyboard lies flat—there's no mechanism for tilting up the rear of the computer.

On the positive side, the 2400c does have function keys as well as cursor keys arranged in an inverted-T pattern, but in every other way the keyboard layout falls short. To slightly reduce manufacturing costs for the U.S. model, Apple and its partner IBM Japan used the same keyboard switch positions as those of the Japanese version. The result is a scrambled keyboard, the worst ever made for a Macintosh. The delete, return, and right shift keys are not only too small, but each is positioned an extra space over to the right because Japanese keyboards have an extra row of vertical keys.

What's worse, the cramped keyboard dimensions easily could have been avoided. The 2400c's case is actually large enough to accommodate a Duo-size keyboard; its rounded sculpting and the odd layout force the smaller keys. It's a ready-made opportunity for a keyboard maker.

Macworld's Buying Advice

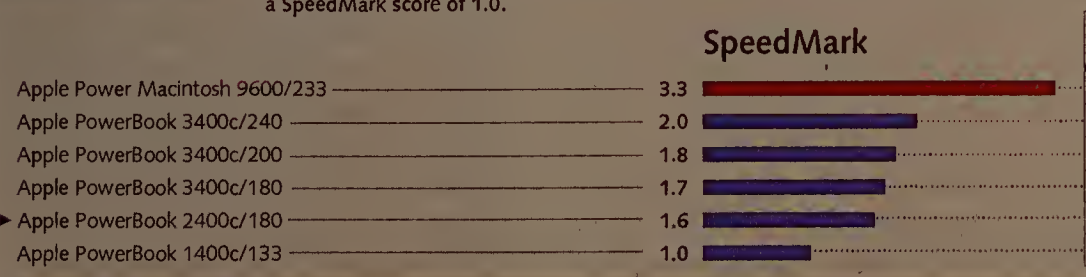
If you can live with the keyboard's shortcomings, you will probably love the 2400c, despite its high price and the fact that you'll need at least a 32MB RAM card. I still consider the Duo a better writing tool, although the 2400c is unquestionably a much better computer.—CARY LU

RATING: ★★★/5.9 **PROS:** Fast, lightweight, and compact; offers all standard ports. **CONS:** Tiny, cramped keyboard with nonstandard layout. **COMPANY:** Apple Computer (408/996-1010, *www.apple.com*). **LIST PRICE:** $3500 as tested (32MB of RAM, 1.3GB hard drive, 256K cache).

Macworld LAB TEST

PowerBook 2400c—Solid Subnotebook Performance

Best overall performance. Longer bars are better. Bold indicates best result in a specific test. ► New system. An Apple Power Macintosh 7100/80 has a SpeedMark score of 1.0.



	CPU	FPU	Disk	Video	Star Rating
Apple Power Macintosh 9600/233	**3.5**	**3.4**	**2.3**	**6.9**	★★★/6.6
Apple PowerBook 3400c/240	2.1	2.1	1.6	2.3	★★★★/7.2
Apple PowerBook 3400c/200	1.9	1.9	1.5	2.1	★★★★/7.1
Apple PowerBook 3400c/180	1.8	1.7	1.4	2.0	★★★★/7.0
► Apple PowerBook 2400c/180	1.7	1.7	1.3	2.1	★★★/5.9
Apple PowerBook 1400c/133	1.1	1.0	1.0	1.0	★★★/6.1

Behind Our Tests For details on our benchmarks, see *Mac Superguide*, September 1997, or *www.macworld.com/tests/*.—Macworld Lab testing supervised by Mark Hurlow

QuickTime VR Tools

NEW STITCHING SOFTWARE MAKES VR A REALITY

APPLE'S QUICKTIME VR TECHnology lets you create interactive panoramic images that make viewers' heads spin, encouraging them to explore everything from scenic vistas to home interiors. But until recently, producing a panorama was virtual torture. Aside from freeware tools (see *Media*, *Macworld*, January 1997) that yielded disappointing results, the only alternative was Apple's QuickTime VR Authoring Tools Suite.

Three new programs make creating QuickTime VR movies virtually painless: PictureWorks' Spin Panorama, Panimation's Nodester, and Live Picture's PhotoVista. Both Spin and Nodester are designed specifically for QuickTime VR moviemaking; PhotoVista creates movies for Live Picture's RealSpace technology, a QuickTime VR competitor, but also lets you save movies in QuickTime VR format. Apple has also updated its QuickTime VR Authoring Tools Suite. Version 2.0 isn't any easier to use than its predecessor, but it does offer some significant features that the other programs lack.

Photographing in Circles

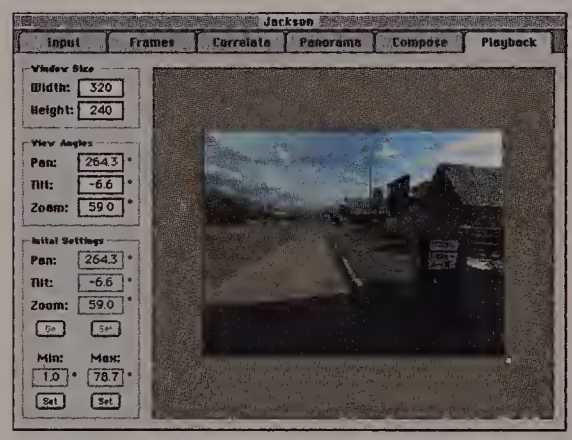
The first step in creating a QuickTime VR panorama is to take a series of photographs. You rotate the camera after each shot until you've captured 360 degrees, allowing some overlap between images so the software can stitch them together.

Of the authoring programs I tested, only Nodester can control a camera during the photography phase. Nodester includes plug-in modules for Apple's QuickTake 100 and 150 (but not the 200), for Polaroid's PDC-2000, and for a QuickTime-compatible video-digitizing card. With these plug-ins, you can snap an image by clicking the mouse button—handy if you have a PowerBook tethered to your camera. Panimation plans to make plug-ins for additional cameras available from its Web site.

Importing and Tweaking

After you've shot an image sequence, you import the images into your QuickTime VR authoring program. Nodester and Apple's suite require source images in PICT format; PhotoVista and Spin import additional formats, such as JPEG.

Nodester, Spin, and PhotoVista provide a workspace in which you specify source images, stitch them, and save them as finished panoramas (see "Spin Doctoring"). PhotoVista, Nodester, and the Apple tools require you to specify the focal length of the lens you used or the images' field of view. With presets for dozens of digital cameras and lens formats, PhotoVista has the edge over Nodester—choose your camera, and PhotoVista sets the technical details for you. Spin doesn't require you to enter any lens or field-of-view information: you just specify the folder containing the source images. Unfortunately, you pay for this simplicity later in the production process.



Spin Doctoring Like Spin, Nodester (top) and PhotoVista (bottom) give you an interactive workspace in which you build your VR panoramas.

Depending on how your camera was oriented during the photography phase, you may need to rotate the source images 90 degrees. PhotoVista, Nodester, and Apple's suite let you rotate all the images automatically; with Spin, you have to rotate the images one at a time.

Nodester is unique among the programs in providing a built-in image editor that you can use to tweak an imported photo. The editor's tools—an airbrush, paintbrushes, and a rubber-stamp tool—are limited, but it's perfect for simple retouching, such as removing a telephone pole or other intrusions.

A Stitch in QuickTime

In the stitching phase, QuickTime VR software blends the source images into a seamless panorama. All the programs except Spin handle this process automatically by identifying areas of overlap, then combining the images at those points.

You can also fine-tune the correlation process manually. PhotoVista's manual-stitching features are the best—you drag one image until it overlaps its neighbor precisely, or use the arrow keys to nudge the image in single-pixel increments. Nodester doesn't let you drag images; you have to press the arrow keys or click on arrow buttons in the Nodester window. At least Nodester lets you reverse an action; PhotoVista lacks an Undo command. But PhotoVista is the only program that offers a convenient "preview stitch" mode, which performs a fast, low-resolution stitch you can use to check your lens and correlation settings.

With Spin, manual stitching is your only option. You tell Spin where images overlap by positioning four sets of control points for each—a time-consuming, labor-intensive job. This shortcoming alone makes Spin unsuitable for high-volume QuickTime VR production.

Saving and Compressing

The result of a stitching session is a very wide image file containing the panorama. All the programs tested let you save this file for printing or for subsequent tweaking in an image-editing program.

Nodester's unique built-in image editor also comes in handy for working with stitched panoramas; besides basic editing, you can resize a panorama (handy when you want to create small VR movies for fast Web downloading) and sharpen it. Nodester's fine-tuning features are also by far the easiest to use: simply navigate to the portion of the panorama you want to be visible, and click on the Set button. With Apple's crude tools, you must calculate and enter these settings manually.

After stitching the images, you save the panorama as a VR movie. Nodester

The QTVR Panorama: Four New Development Tools

	Nodester	PhotoVista	QuickTime VR Authoring Tools Suite 2.0	Spin Panorama
Company	Panimation	Live Picture	Apple Computer	PictureWorks
Star Rating	★★★★/8.0	★★★★/7.8	★★★★/7.8	★★★/6.9
Price	$169.00	$129.00	$395.00	$99.95
Phone	407/599-9697	408/438-9610	408/996-1010	510/855-2001
Web address	*www.panimation.com*	*www.livepicture.com*	*www.apple.com*	*www.pictureworks.com*
Pros	Excellent control over movie output; built-in image editor; powerful feature set.	Inexpensive; fast; small memory footprint; RealSpace panoramas are compact.	Unmatched feature set; support for multiple-node movies; full support for QuickTime VR 2.0.	Inexpensive; easy to use.
Cons	Limited support for cameras and lenses; no printed manual.	Poor QuickTime VR export; no Undo command.	Extremely difficult to learn and use; expensive.	No automatic stitching; minimal control over final movie.

and the Authoring Tools Suite give you the greatest control over the finished movie; for instance, you can specify the portion of the panorama you want to be visible when the movie opens, as well as its initial zoom settings. PhotoVista and Spin don't allow such adjustments.

Apple's tools and Nodester are also the only programs that let you choose the compression scheme for the final movie. The Cinepak compressor is popular for QuickTime VR work, although Apple's latest QuickTime VR browser plug-ins also support JPEG, which allows for smaller (and therefore faster-downloading) movie files. A Cinepak-compressed VR movie might range from 180K to 1MB, while a JPEG-compressed movie can be around 50K.

PhotoVista is designed for creating movies in Live Picture's RealSpace format, which uses JPEG compression exclusively for nice, compact panoramas. When you save a PhotoVista panorama in QuickTime VR format, however, it uses Cinepak compression—resulting in significantly larger files. Another advantage of Real Space over the current version of QuickTime VR is that a Web site's visitors can begin navigating a panorama almost immediately while it's downloading, and it supports spherical panoramas (which let users look straight up and down). But there's a catch: to view RealSpace movies, your site's visitors must download and install the RealSpace browser plug-in. Apple's QuickTime plug-in, by comparison, is included with Netscape Navigator 3.0 and later as well as with QuickTime for Windows, making it nearly ubiquitous.

Nodester and Apple's authoring tools let you create clickable hot spots that take users to other Web pages or VR movies. (Neither PhotoVista nor Spin supports hot spots.) Nodester's hot-spot editor is particularly easy to use: just draw the hot spot and type a URL. But Apple's product is the only one that lets you create a multiple-node VR movie—a single movie file that contains multiple panoramas linked via hot spots. (Multiple-node movies tend to be too large for Web distribution and are typically limited to CD-ROMs.)

Performance and Memory

Correlating and stitching a dozen or more images into a navigable panorama is a complicated job that requires a fair amount of memory and processing punch. Of the programs tested, PhotoVista has the humblest system requirements—it runs in a mere 1.8MB. Spin's suggested memory allocation is 12MB, Nodester's is about 16MB, and Apple's suite needs a colossal 40MB.

PhotoVista is the fastest of the programs that stitch automatically, but Nodester is no slouch—its performance was quite satisfactory on a 200MHz 603e-based machine. As for Apple's tools, performance is less of an issue because the software doesn't provide the highly interactive user interfaces of the other three programs; you create a script and run it, then go off and do other things while the software prepares your movie.

Macworld's Buying Advice

For creating single-node QuickTime VR movies, you can't beat Panimation's Nodester. Although it lacks a printed manual and could use more tips and background information, it has a smooth, efficient user interface and offers far more control over the VR development process than either Spin or PhotoVista. PictureWorks' Spin is suitable for casual QuickTime VR tinkering on slower machines, but its lack of automatic stitching and minimal output options make it unusable for serious VR work. Apple's QuickTime VR Authoring Tools Suite remains the only option for making multiple-node movies and for taking advantage of the advanced capabilities of QuickTime VR 2.0. This package is still difficult to use, however—expect to invest many hours getting up to speed with it. PhotoVista is an excellent choice if you want to create panoramas for the RealSpace technology, though the advantages of RealSpace over QuickTime VR are outweighed by the need to download a plug-in to view the panoramas; after all, what good is having smaller, progressively downloading VR files if your site's visitors don't download and install a plug-in to view them?

Although PhotoVista, Nodester, and Spin make creating VR movies easier than ever, there's still room for improvement. I'd like to see a gamma-adjustment option that lets you lighten a panorama for better display on Windows machines. And for Web movies, I'd like an option to specify a target file size and have the program automatically adjust compression and scaling options to arrive at that size.

But overall, the new generation of development tools is a dream come true for anyone who wanted to make QuickTime VR movies but was intimidated by Apple's developer-oriented tools. Approachable, affordable QuickTime VR development is finally a reality.—JIM HEID

AppleShare IP 5.0

SERVER SOFTWARE IS A JACK-OF-ALL-TRADES, FASTER THAN NONE

THE LATEST VERSION OF APPLE'S server software lets a Mac OS file server wear many hats. In addition to acting as a standard file server, AppleShare IP 5.0 serves up Web pages, delivers files via FTP, and distributes Internet mail. More important, it adopts TCP/IP as a full-fledged Mac communications protocol. (The print server is the only component of version 5.0 that's still AppleTalk-only.) The server software still speaks AppleTalk, so it's fully compatible with existing Mac networks, but TCP/IP support means it can share files, mail, and Web pages with PCs and Unix workstations as well.

Unfortunately, version 5.0's file server is scarcely faster than its predecessor, AppleShare 4.2.1, and woefully slow compared with Microsoft Windows NT Server (see "AppleShare IP vs. Windows NT: Windows Wins"). As a Web server, AppleShare IP 5.0 holds its own against its main Mac competitor, but also comes up short compared with Windows NT Server.

What's in the Box

AppleShare IP actually comprises five separate applications—a file server, a Web server, an FTP server, a POP mail server, and a print server—along with a nice collection of bundled software. All five programs are tightly integrated via OpenDoc; for example, you can set privileges for Web, file, and FTP access from a single window, and move between management applications via a button or menu.

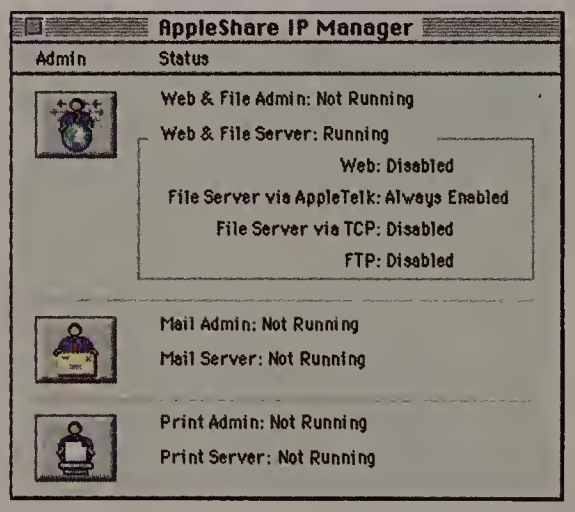
Although AppleShare's interface has been updated to provide easy administration and full integration among components, the package has a few blemishes leftover from previous versions. You still can't manage multiple AppleShare servers from a single Mac, or split AppleShare IP's applications among several Macs; you can't administer a server remotely without Apple Remote Access or Farallon's Timbuktu; and despite support for TCP/IP-based services, you can't perform any management tasks via TCP/IP.

To use AppleShare IP, you need a PowerPC-based Mac, System 7.6 (included) or greater, and 32MB of RAM.

No Cobwebs Here

The ability to serve Web pages from a Mac is nothing new, but AppleShare IP is Apple's first attempt at commercial Web-server software. It's also the first Mac implementation to combine a Web server with a file server.

Apple's Web server allows you to store entire Web sites on a local workgroup server with an Internet connection. You can make the server accessible from within your organization just as you would a file server; that way, users can publish their own Web pages by dropping HTML and graphics files into a folder



Integrated Admin AppleShare IP Manager provides status information on the server's components; the three buttons launch applications that configure server functions.

on the server. Although you can add features to the Web server with commercial and shareware CGIs, AppleShare IP 5.0 doesn't support StarNine WebStar–compatible plug-ins. (Version 5.5 should support plug-ins, according to Apple.)

Apple isn't marketing AppleShare as a full-fledged Web server, but tests show that AppleShare IP gives WebStar a run for its money. WebStar 2.0 and AppleShare IP topped out at 108 and 109 connections, respectively, with AppleShare IP in the lead up to a client load of 56. Windows NT Server's built-in Internet Information Server, on the other hand, easily handled 840 connections per second with 60 clients connecting. These results are encouraging for administrators looking to avoid dedicating a server to Web access, but it's important to remember that adding file-server and other chores to an AppleShare IP server will slow things down if you have a busy site.

File Server Face-Lift

The most important new feature in AppleShare IP 5.0—TCP/IP-based file-server access—is relatively transparent. Whether using AppleTalk or TCP/IP, users mount server volumes from the familiar Chooser or by creating aliases that point to shared volumes, just as with previous versions of AppleShare. Administrators have it just as easy: once the server's TCP/IP connection is configured, there's no need to make a distinction between AppleTalk and TCP/IP privileges. TCP/IP support also allows Apple servers to comply with the corporate requirement that servers support industry-standard protocols.

To test AppleShare IP's file-serving capabilities, we compared it to its predecessor, AppleShare 4.2.1, and to its most formidable competitor in the PC marketplace, Windows NT Server. Using the fastest workgroup server available, with plenty of memory and storage (to prevent inadequate hardware from bogging down the server software), we ran the NetBench suite to simulate the impact of up to 60 clients connecting to and transferring files from the server. We also tested a similarly configured Windows NT server.

AppleShare IP using AppleTalk was slightly slower than AppleShare 4.2.1. TCP/IP-based file transfers were faster than those done over AppleTalk, but only by 17 percent at a client load of 52 (where TCP/IP speed maxed out). In comparison, Windows NT Server was almost five times faster than AppleShare IP when both were running at their peak speeds.

While TCP/IP-based file transfers from an AppleShare IP server to Mac clients are faster than file transfers over AppleTalk, the fact that TCP/IP uses larger data packets means it can't overcome the bottlenecks created by the Mac OS itself. Because Windows NT Server uses its own AppleTalk stack to communicate with Mac clients, TCP/IP doesn't account for the server's stellar performance in our tests; rather, the server's superior file and I/O systems are responsible for its success. This debunks the myth that AppleTalk is an insurmountable obstacle to speedy server performance.

continues





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On the other hand, if you use your file server primarily to move large files to and from a few users' Macs, AppleShare IP over TCP/IP may offer a speed boost over AppleTalk-based AppleShare. When we copied a 50MB file from the AppleShare IP server to a Power Computing PowerCenter 120 client, TCP/IP performed 86 percent faster than AppleTalk.

New and Old Server Tools

Like file sharing, AppleShare IP's FTP server gives users access to a directory of files. Server administrators can use the same user and group privileges available from the file and Web servers to grant FTP access, and can make server folders accessible via file sharing or FTP. Several stand-alone Mac FTP servers are available, including Maxum Development's Rumpus, but AppleShare IP's integration of FTP with other services sets it apart. Besides being familiar to most Internet users, FTP has the advantage of being platform-independent—all you need is an FTP client and an Internet connection.

Stand-alone e-mail applications often perform poorly from a file server, or actually conflict with AppleShare. AppleShare IP addresses this problem with its own mail-server software. Based on Claris OfficeMail, the software supports both LAN-based (AppleTalk) and Internet (POP) e-mail. Users can retrieve their AppleTalk e-mail with Claris Emailer 2.0, included with AppleShare IP, and their Internet mail from any Mac or PC POP client (including Emailer). Adding a user account is as simple as pulling down a menu and typing the user's name. E-mail, file-server, and Web-server accounts are all managed from the same application.

Another AppleShare component, the print server, hasn't changed much since version 4.2.1. The AppleTalk-only spooler does sport a new, Desktop Printers–inspired interface, however.

Who Needs AppleShare?

AppleShare IP is more than an upgrade to a file-server application; it's a long-awaited solution for small businesses and corporate workgroups that want to use a Mac server to publish on the Internet or want to support PC users. The integrated file, Web, FTP, and mail services will allow some companies to forgo the purchase of dedicated server hardware and software for e-mail or the Web.

TCP/IP-based file access is the biggest boon to workgroups and departments within large companies. Because AppleShare supports FTP, departments can share files with PC users in the office or make them available to the public. Using the bundled AppleShare Client for Windows (Windows 3.1) or COPSTalk, CoOperative Printing Solutions' AppleTalk client software for Windows 95 (see *Reviews*, November 1996), Windows users can even mount AppleShare volumes. E-mail access through any POP client is also completely cross-platform.

The Shape of Things to Come

A few of AppleShare IP's deficiencies should be corrected in version 5.5 (slated for release this winter). Along with support for WAPI, the Web server plug-in architecture developed by StarNine, the update will support the IMAP mail standard and LDAP directory services. Apple also plans to move toward a browser-based interface, which would allow greater management flexibility as well as remote administration. Version 5.5 won't be completely browser-based, but features such as Users & Groups management should be. And when Rhapsody is released, AppleShare IP will likely become even more focused on TCP/IP and browser-based management.

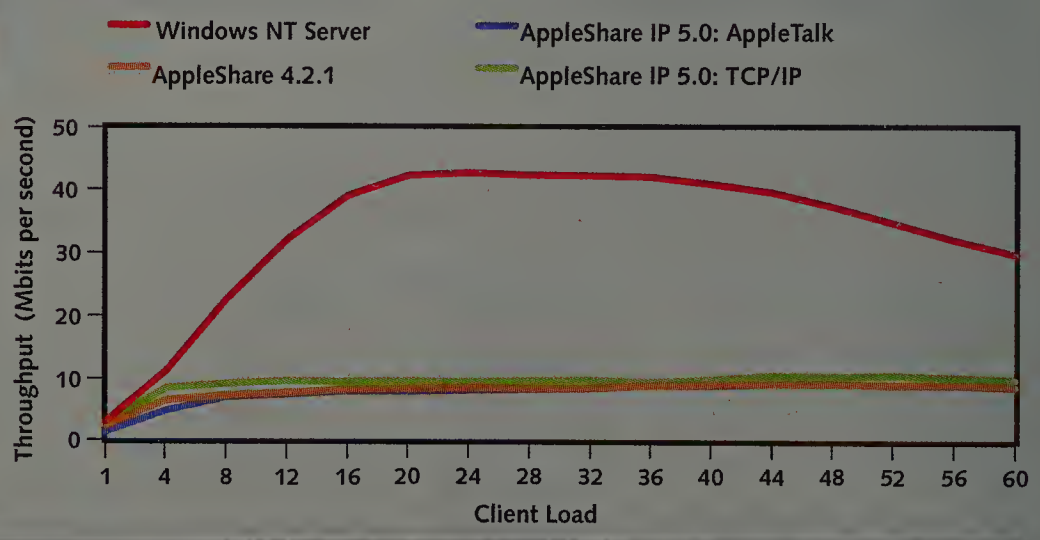
Macworld's Buying Advice

If you're counting on AppleShare IP to speed up your network or fend off a move toward Windows NT Server, you may be disappointed. But if you like the idea of a multifunction Internet server and appreciate Apple's elegant integration and simple server administration, AppleShare IP may be just what your workgroup or small office needs.—SHELLY BRISBIN

RATING: ★★★/6.8 **PROS:** TCP/IP-based file sharing; elegant interface; good integration among applications. **CONS:** Disappointing performance; AppleTalk-only print server; no remote administration. **COMPANY:** Apple Computer (408/996-1010, *appleshareip.apple.com/appleshareip/index.html*). **LIST PRICE:** For 5 clients $799; for 50 clients $1349; for unlimited clients $1999.

MacUser LABS

AppleShare IP vs. Windows NT: Windows Wins



Behind Our Tests The NetBench suite is designed to stress a file server by simulating heavy client activity. To test AppleShare, we used an Apple Workgroup Server 9650/233 with 128MB of RAM and two 4GB Seagate drives arranged in a software-controlled RAID 0 array. We connected the server, along with 60 Mac client machines running System 7.5.5, to a 100BaseT Ethernet network and installed Open Transport 1.1.2 and AppleShare client 3.7 on each client. (For the AppleShare 4.2.1 test, we used AppleShare client 3.6.) This high-powered server and network configuration ensured that any speed bottlenecks would be caused not by the server or the network, but by the software being tested. We assembled a similar PC configuration (HP Netserver E-40 with two 2GB Seagate disk drives, arranged in a software-controlled Level 0 RAID) to test Windows NT Server.—**MacUser Labs testing supervised by Eric Chapman**

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Internet Content Filters

CYBERPATROL, SURFWATCH, X-STOP AREN'T FOOLPROOF

ALTHOUGH THE WEB CAN BE A great educational resource, it also provides easy access to sites inappropriate for kids. Content-filtering tools help by blocking access to sites, letting you more readily give children unmonitored access to the Web.

Three filter products—Microsystems' CyberPatrol 2.0, SpyGlass's SurfWatch 3.0, and Log-On Data's X-Stop 1.0—block Internet access by using site lists, word filters, and content categories. Each company maintains its own proprietary lists of "bad" sites and content triggers, which you can modify as needed.



Censored CyberPatrol monitors Web use with selective categories, filters for multiple users, and control access based on total usage and time of day.

Basic Blocks

All three products ship with a set of basic filters, geared to block unsuitable sites and to prevent search-engine queries of blatantly inappropriate terms. But none of the products work to their full potential until you update the filters via the vendor's online service. Each vendor maintains an up-to-date list of barred sites and services. Keep in mind that you must pay for updates after the first year, and CyberPatrol even charges for updates during the first year of use.

SurfWatch updates its filters every time you reboot, and CyberPatrol lets you click on a button in its administration panel to get the latest updates. X-Stop, however, requires you to download filters from a Web site, then decompress and manually execute the updater. SurfWatch's automatic approach is the most foolproof, and you can get updates on demand between reboots. CyberPatrol and X-Stop, though, require that you periodically update the filters yourself, a chore that can be easily neglected.

In addition to using filter updates, each product lets you adjust the filtering controls. With SurfWatch and CyberPatrol, you can engage broad filter categories, such as sexually explicit, gambling, and violence; CyberPatrol's list of 16 categories gives you finer control than SurfWatch's list of 4. Both also let you block access to Internet Relay Chat (IRC), particularly important because the interactive nature of IRC makes it easy for kids to divulge information about themselves. SurfWatch only gives you all-or-nothing blocking, while CyberPatrol lets you block based on chat-group names or trigger words that may occur in inappropriate discussions. X-Stop lacks both category controls and IRC blocking.

Customize Your Control

Each product lets you add to the list of blocked sites and words. Both CyberPatrol and SurfWatch have a clear, intelligent interface for this function. X-Stop uses a clunky dialog box that only lets you make blind changes—you can't see changes you've already made.

Other Internet services, such as FTP sites and certain online games, can deliver material just as harmful as what a child might find in a Web browser. All the products provide name-level protection for other services: if the site name is on the exclusion list, access to any service at the site is blocked. CyberPatrol includes the ability to content-check other services, including games and applications, preventing even the downloading of decompression utilities.

Beyond its filtering capabilities, CyberPatrol offers two other useful features. Multiple password-protected filters let you tailor protection for a particular age group or individual. CyberPatrol also lets you limit access based on total usage or times of the day. With SurfWatch's default home page, the Yahooligan's Web site, you can abandon filtering altogether, in favor of a search engine that permits access only to previously inspected and cleared sites.

Setting Up Your Sitter

SurfWatch includes a concise printed manual with sections such as troubleshooting, and convenient online help. X-Stop's user manual contains all the essential information, but its coverage of both PC and Mac platforms makes it confusing. The disk lacks an installer, and the package lacks both online documentation and troubleshooting aids. CyberPatrol forgoes printed documentation altogether, providing only an online guide.

Macworld's Buying Advice

All the products lived up to filtering expectations, staying out of the way except when necessary to block access. For the most convenient and foolproof blocking, SurfWatch is hard to beat. Its automatic updates and simple category-based filtering are easy to understand and maintain. If you need more control, or need to provide filtering for various individuals or age levels, go for CyberPatrol. X-Stop works well at filtering but lacks both the control and convenience features of the other products. Its low price, though, includes a year of daily filter updates.—MEL BECKMAN

CyberPatrol 2.0

RATING: ★★★★/8.0 **PROS:** Large number of filter categories; multiple-user support; fine control of filtering options. **CONS:** No printed documentation; filter updates aren't automatic; charge for first year of weekly updates. **COMPANY:** Microsystems Software (508/879-9000, *www.microsys.com*). **LIST PRICE:** $29.95; weekly updates $29.95 per year.

SurfWatch 3.0

RATING: ★★★★/8.5 **PROS:** Excellent documentation; automatic filter updates; category-based filter controls. **CONS:** All-or-nothing block on IRC. **COMPANY:** Spyglass Software (415/948-9500, *www.surfwatch.com*). **LIST PRICE:** $49.95; includes one year of daily updates.

X-Stop 1.0

RATING: ★★★/6.0 **PROS:** Reliable operation; low overall cost. **CONS:** Filter updates are not automatic; no category filters; clumsy filter update interface. **COMPANY:** Log-On Data (714/577-4929, *www.xstop.com*). **LIST PRICE:** $39.95; includes one year of daily updates.



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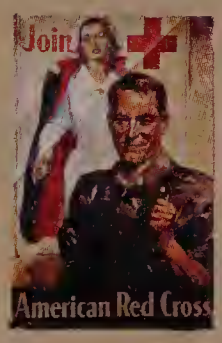


NEC MultiSync MT810 and MT1000 LCD Projectors



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4 IN A DISASTER, *one of the things that helps give you peace of mind is the rigorous training of the Red Cross. In a presentation, one of the things that helps give you peace of mind is the superior performance of the new MultiSync MT LCD projectors (not to mention their reliability and incredible ease of use).*





3 THE RED CROSS IS IN THE BUSINESS *of saving lives. In some ways, perhaps, one could argue that we are as well. You see, the new MultiSync MT Series LCD projectors are so reliable that they're backed by a whole new level of customer service. It's called InstaCare service from NEC Technologies. And in the unlikely event of a problem, it guarantees a replacement projector within 24 hours at our expense.*

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PrimeraPro Elite

FLAWED DYE-SUB/THERMAL-WAX PRINTER

UNTIL RECENTLY, GRAPHIC ARTists reliably turned to combination dye-sublimation/thermal-wax printers for all their color output needs. After all, in terms of quality, a dye-sub's print was almost indistinguishable from a photograph, and having thermal-wax capabilities in the same printer meant you could produce cheap and easy proofs, moving on to the more expensive, higher-quality dye-sub prints only for color comps.

Although the near-photo quality of expensive dye-sublimation printers hasn't changed, the color output from lowly ink-jet printers has improved almost beyond belief in the last year. Since the price of dye-sub printers (and their consumables) has remained high, many graphic artists—and others who need high-quality color output—have opted for top-notch color ink-jets instead.

Fargo Electronics hopes to win back the dye-sub/thermal-wax faithful with the PrimeraPro Elite, successor to the popular PrimeraPro. The PrimeraPro Elite offers both CMY dye-sub output and CMYK thermal-wax prints, and delivers them both at faster speeds than its predecessor. Even better news: for professionals who need in-house color proofing and final output that doesn't cost a fortune, the PrimeraPro Elite costs less than half as much as Fargo's top-rated Pictura 310.

Fargo has also improved the printer's resolution from that of the PrimeraPro. The printer defaults to 300 by 300 dpi, but you can adjust it to 600 by 300 dpi via the Page Setup dialog box. The PrimeraPro Elite automatically switches between its parallel and serial port, but offers no Ethernet connection. An optional PostScript Level 2 package is slated to be available soon, although pricing was not set at press time.

Unacceptable Quality

Despite all of Fargo's good intentions with faster speed and improved resolution, one fact stands out: the quality of the PrimeraPro Elite's dye-sub prints remains below par. Some of it is the fault of the composite black of its CMYO ribbon: when printing Macworld Lab's QuarkXPress test document, the PrimeraPro Elite's text was more reddish-brown than true black. (The *O* stands for the clear *overlay*—FotoShield in Fargo parlance—which helps protect dye-sub prints from fading UV rays, fingerprints, and other hazards.) The quasi black also lessened the overall quality of the PrimeraPro Elite's Adobe Photoshop test image, which lacked vibrancy as well as contrast in shadowed areas.

The real letdown, though, came in the illustration test, a Macromedia FreeHand document. Although its colors were bright and relatively true to those of the original, the image suffered from excessive ghosting and the bleeding of image elements into surrounding areas. This flaw in the dye-sub output is particularly egregious when output samples are compared with the best-quality prints from the Epson Stylus 800—a printer that costs one-quarter the price of the PrimeraPro Elite (see "The Proof Is in the Printing").



The Proof Is in the Printing The PrimeraPro Elite's output (left) offers vibrant, continuous-tone color but an unacceptable number of ugly artifacts. Comparing its output to that of the $449 Epson Stylus Color 800 (right) shows the Fargo's $2195 price tag is too high.

Simple Consumables

Whether operating in dye-sub or thermal-wax mode, the PrimeraPro Elite transfers color to the page via a roll of color ribbon resembling plastic wrap. Installing the ribbon is as easy as pie: you drop the ribbon and its take-up spool into a plastic caddy, and put the whole thing into the printer. The PrimeraPro Elite ships with two caddies—one for dye-sub and one for thermal-wax—to make switching ribbons a snap, even at midroll.



ARNOLD TIOSEJO

The PrimeraPro Elite comes with sufficient dye-sublimation paper and CYMO ribbon for 10 "A4 extended" letter-size prints. CYMO ribbons for 50 prints cost $111.95; a 50-sheet pack of dye-sub paper costs $52.95. Supplies for lower-quality thermal-wax proofs are cheaper: four-color ribbons cost $45; paper costs $9.95 for 200 standard pages, or $21.95 for 200 sheets of thicker premium stock.

Macworld's Buying Advice

As we stressed the last time *Macworld* rated dye-sublimation printers (see "Full-Proof Printers," January 1996), speed is important in this product class, but output quality is paramount. And although the PrimeraPro Elite is faster and less costly than Fargo's Editors' Choice–winning Pictura 310, the PrimeraPro Elite's print quality falls so far below basic expectations for a dye–sub printer that I can't recommend it.—SUZANNE COURTEAU

RATING: ★★/3.8 **PROS:** Full-bleed letter-size prints; inexpensive for dye-sub/thermal-wax combo; knowledgeable technical-support staff. **CONS:** Unacceptable dye-sub prints. **COMPANY:** Fargo Electronics (612/941-9470, *www.fargo.com*). **LIST PRICE:** $2195.

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LAN TIMES READERS' CHOICE 1996

Digital Photo Printers

TRANSFORM YOUR PIXELS INTO POSTCARDS

THREE DIGITAL PHOTO PRINTers claim to transform electronic photo files into hard-copy masterpieces that rival photographs: Panasonic's TruPhoto Printer, Fujifilm's NC-2 Digital/Video Printer, and Fargo's FotoFun Digital Color Photo Printer. Although these printers aren't as messy and time-consuming as traditional developing techniques, only one of them approaches the quality you'd expect from a photo studio. And don't be fooled—even though there's no charge for film with digital cameras, the special photo paper evens out the cost.



SUZANNE ROADY

The Fujifilm NC-2 (top left), Fargo FotoFun (bottom left), and Panasonic TruPhoto.

Picture Perfect?

Thanks to ample documentation and easy-to-follow directions, we had each of the three printers up and running in less than six minutes. To compare output quality, we printed a colorful 300-dpi scanned image and a 128-dpi shot from an Olympus D-200L digital camera (see "Snap It," in this issue). Not surprisingly, higher-resolution scanned images produced better-looking prints than low-resolution digital camera images, which looked fuzzy compared with prints from a typical photo lab, even after we resampled snapshots to match the printer's postcard-size paper. Only the 300-dpi scanned images produced pleasing prints that mirrored the quality of traditional photographs.

Of the three devices, the FotoFun offers the best-quality pictures: its colors are bright yet not garish, its hues appear almost identical to those of on-screen images, and subtle tonal details in high-light and shadow areas are clearly visible in each print. Even with lower-resolution digital-camera shots, the FotoFun's prints appeared sharper and more vivacious than the NC-2's and TruPhoto's results. Another FotoFun perk is its unique ability to bleed images off the edge of the paper.

Ready, Set, Print

The FotoFun is housed in a drab putty-colored box the size of an old telephone. Sure, the AC adapter looks like a brick on a leash and the printer growls like a bobcat, but the results are worth the three-minute wait. However, it's not as easy as you may think—loading the FotoFun takes practice. To begin, you press a lever that pops open the printer; unwrap one of the tinsel-thin ribbons—a tricky task if you want to avoid wrinkling it; insert the ribbon spool into a spring-loaded sprocket; then shut the printer. Refill kits for 36 additional prints cost $40.

Unlike the FotoFun, the NC-2 and the TruPhoto share similar thermal printing technology. They don't use ink, toner, or ribbons but instead rely on heat-sensitive printing paper (packets of 20 sheets sell for $15). The paper, packed in a light-tight bag to avoid fogging, shouldn't be exposed to light for more than five minutes. Both printers load in the same easy manner: open a front panel, insert the paper, and click the panel shut.

Aesthetically, the NC-2 and the TruPhoto are similar, except that the TruPhoto's case is blue and the NC-2's is black; each takes up about as much space on your desk as an answering machine. The only other difference is that the NC-2 unit sports controls that allow you to nab live and still shots from a camcorder, VCR, or TV. As long as the NC-2 is connected to one of these devices, you also have access to on-screen menus that let you determine the orientation and position of the picture and give you the option to print up to 16 thumbnails per sheet.

Because all three printers need four passes to produce a single image, printing can be tedious. Lacking a controller to process print jobs, they all rely on the Mac to do the bulk of the grunt work. Theoretically, the more powerful your Mac, the quicker the job. Shots emerged from the FotoFun and the NC-2 in less than three minutes—a full 60 seconds ahead of Panasonic's TruPhoto.

Despite their transparent UV coating, prints from these models fade sooner than an ordinary photograph would. Our advice: preserve prints by storing them in an album and avoiding bright rooms and fluorescent lights.

Macworld's Buying Advice

With Fargo's FotoFun printer, dreaming up fun projects is part of the thrill. Simple printouts can become promotional business postcards, birthday party invitations with a photo of the guest of honor, or custom-made holiday greetings. The Fargo and Fujifilm printers cost under $700, but whether you're using high-resolution images from a scanner or screen-resolution images from a digital camera, only the FotoFun produces first-rate prints that approach the quality of traditional prints from film. If money is tight, consider the Panasonic TruPhoto, which offers slightly better color quality than the Fujifilm NC-2 at a price $300 lower.—JOHN GODDARD

FotoFun Digital Color Photo Printer

RATING: ★★★/6.6 **PROS:** Prints high-resolution images sharply; excellent color saturation; small footprint. **CONS:** Noisy; detailed setup required. **COMPANY:** Fargo (612/941-9470, *www.fargo.com*). **COMPANY'S ESTIMATED PRICE:** $599.

NC-2 Digital/Video Printer

RATING: ★★/4.0 **PROS:** Decent photo quality with high-resolution images; captures, stores, and prints shots from TV or VCR; prints up to 16 images in a single sheet. **CONS:** Faint magenta tint in images. **COMPANY:** Fujifilm (914/789-8100, *www.fujifilm.com*) **COMPANY'S ESTIMATED PRICE:** $699.

Panasonic TruPhoto Printer

RATING: ★★/4.0 **PROS:** Average photo quality with high-resolution images; accurate color. **CONS:** Slow; so-so detail on lower-resolution graphics. **COMPANY:** Panasonic (408/653-1888, *www.truphoto.com*). **COMPANY'S ESTIMATED PRICE:** $399.

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Plug-in Illustration Tools

GIVE ILLUSTRATOR, FREEHAND A FEATURE INFUSION

GRAPHIC ARTISTS WILL FIND A lot to like in three new plug-in collections that squeeze the last drop of creativity from Adobe Illustrator 7.0. Extensis's VectorTools 2.0 is an eclectic set of drawing tools and interface enhancements that also work with Macromedia FreeHand 7; Hot Door's CADtools 1.0 and Vertigo Technology's Vertigo 3D Words 1.0 are more functionally focused, offering drafting tools and 3-D text capabilities, respectively.

What's the Vector, Victor?

The successor to Extensis's DrawTools (see *Reviews*, February 1996), VectorTools consists of 11 plug-ins for Illustrator and FreeHand. VectorNavigator, VectorLibrary, VectorColor, VectorShape, VectorMagicWand, VectorTips, and VectorFrame (which applies frames to selected objects) work in either program; the VectorObjectStyles and VectorBars (user-definable tool bars and palettes) plug-ins are just for Illustrator, while VectorTypeStyles and VectorCaps (a global case-setting utility) work only with FreeHand. This smart approach addresses the individual needs of both programs without introducing redundancy.

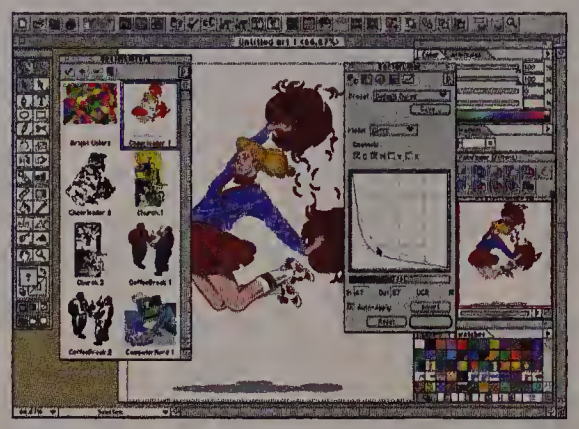
Like Adobe Photoshop's Navigator, VectorNavigator displays a small window showing your location and can transport you across a large document with a single click. I experienced some cursor-flickering over VectorNavigator's window, but otherwise it worked fine. VectorLibrary gives you the convenience of drag-and-drop object libraries; you can scroll through them by name or by thumbnail, keeping frequently used elements or image subassemblies close at hand.

VectorColor's context-sensitive palette lets you edit colors by adjusting individual CMYK values, convert images to gray scale, randomly substitute image colors, produce multitones, and adjust brightness and contrast. VectorShape produces 3-D effects by projecting art objects onto shapes (such as spheres and cones) or an editable free-projection mesh. It, too, is now a floating palette in Illustrator, making the plug-in's interface consistent in both programs.

The star of VectorTools is VectorMagicWand. Like paint-style wands, it selects all paths (objects) that resemble a selected path using any combination of fill color, stroke or weight, and object area. You can define tolerances for each criterion, but you can't set separate tolerances for individual CMYK values; neither can you simply define criteria and select paths.

Specialized Tools

Vertigo 3D Words lets you create 3-D text objects inside Illustrator. Text objects appear in the floating palette's 3-D work area, where you use camera controls to fine-tune the text's appearance—click on Apply, and the text objects are transformed into editable 2-D objects. 3D



Color Correction Adjusting curves on VectorColor's graph turns the cheerleader's gray sweater blue.

Words automatically arranges the letters along a path; you can adjust their tracking, as well as the group's orientation in 3-D space. And it comes with 31 preset paths, including one that creates a unique 3-D path every time you apply it.

Unfortunately, text objects can't be beveled; you can't adjust letterspacing individually along the path, draw a specific path, or edit the presets; and object-positioning controls are unwieldy and a bit confusing. 3D Words also produces only simple colored text and offers a single uneditable light source—it doesn't apply the textures or render the lighting effects possible with 3-D modelers or text-object generators. Still, for simple chores, 3D Words does a nice job.

CADtools adds 33 drafting tools to Illustrator's tool palette. It can't replace a drafting program—for example, you wouldn't want to draw construction plans with it—but for technical illustrations or informational graphics, it's a terrific addition to Illustrator. Drawing tools are added to existing tool pop-ups, while 14 dimensioning options (such as angle, arc length, and Bézier curvature) are appended as new pop-ups.

Included are drafting staples such as filleting and chamfering tools, eight labeling options, a tool for drawing walls and another for quickly healing the intersection of walls, and a Trim tool that's sharper than Illustrator's Scissors. But CADtools' utility isn't limited to drafting—it's sure to find fans among artists as well, though it could use a palette for changing tool attributes (such as stroke width or fillet-tool parameters) on the fly.

Macworld's Buying Advice

Of the three collections, VectorTools is the most universally useful in day-to-day graphic-arts applications, and it works with FreeHand as well as Illustrator. However, artists who rely on Illustrator will find that CADtools' cleanly integrated drafting tools are a valuable addition to their general-use tool sets. And 3D Words, despite its limitations, offers a convenient way to incorporate 3-D text objects into 2-D art.—CARLOS DOMINGO MARTINEZ

CADtools 1.0

RATING: ★★★★/7.1 **PROS:** Makes drafting and dimensioning tools readily available within Illustrator. **CONS:** Adjusting tool settings is inconvenient. **COMPANY:** Hot Door (562/438-0377, *www.hotdoor.com*). **LIST PRICE:** $129.

VectorTools 2.0

RATING: ★★★★/7.7 **PROS:** Good mix of useful tools and interface enhancements; excellent MagicWand tool. **CONS:** MagicWand can't define individual CMYK tolerances. **COMPANY:** Extensis (503/274-2020, *www.extensis.com*). **COMPANY'S ESTIMATED PRICE:** $99.95.

Vertigo 3D Words 1.0

RATING: ★★★/6.6 **PROS:** Convenient creation of 3-D text objects. **CONS:** No object beveling; limited rendering. **COMPANY:** Vertigo Technology (604/684-2113, *www.vertigo3d.com*). **LIST PRICE:** $119.

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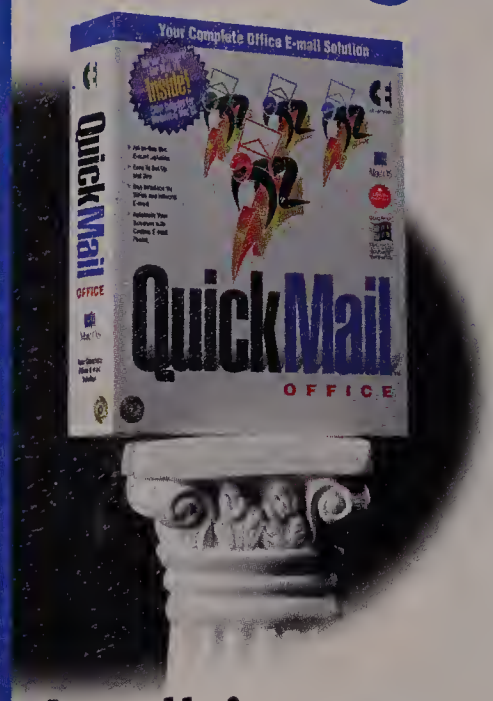
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Web Color Tools

DITHERBOX, HVS COLORGIF KEEP ONLINE IMAGES SLIM

THE WEB IS NO PLACE FOR HIGH-resolution, multimegabyte files; Web designers have to think small by reducing the number of colors in their online images. A pair of new utilities—RDG Tools' DitherBox 1.0 and Digital Frontiers' HVS ColorGIF 2.0—help artists pack high-quality images into minuscule spaces.

DitherBox, an Adobe Photoshop plug-in, takes the unusual approach of expanding your color palette by patterning sets of pixels to create new perceived colors, expanding the usual Web-safe palette of 216 colors to a potential cast of thousands. To create a dark-cream background for your Web page, for example, DitherBox would pair a brown pixel with a light-yellow pixel to create a hybrid color that, when viewed at normal resolutions, approximates your chosen shade. Because the pattern is composed of Web-safe colors, it won't suffer from dithering. Savvy Webmasters have employed a similar technique of creating color grids by hand; DitherBox automates this often-tedious process.

Clicking on the RGB-color square in DitherBox's interface window brings up Photoshop's standard color picker; choose the color you want, click on the conversion arrow, and DitherBox creates the closest approximation of the RGB value. To match colors by hand, you choose colors from the Web-safe palette and place them on the center grid. DitherBox then adds the hybrid colors to a collection that can be named and saved.

Digital Frontiers' HVS ColorGIF 2.0—a Photoshop filter and export module—employs the company's HVS Color technology to compress information based on how the eye views color. The results can be amazing—when I exported a test image using Adobe's GIF89a Export plug-in, it consumed more than 4600 bytes of disk space; the same image run through HVS ColorGIF weighed in at only 1992 bytes.

Unfortunately, ColorGIF's power comes cloaked in a somewhat confusing and button-laden interface, especially when compared with the slick appearance of BoxTop Software's PhotoGIF (see the feature "Make Your Web Graphics Take Off," May 1997) or Pantone's ColorWeb (see *Reviews*, May 1997).



Different Paths to Smaller GIFs By patterning sets of Web-safe colors, DitherBox (top) lets you create thousands of dither-proof hybrid colors. HVS ColorGIF 2.0 (bottom) offers superb color compression, but its button-laden interface can be confusing.

Macworld's Buying Advice

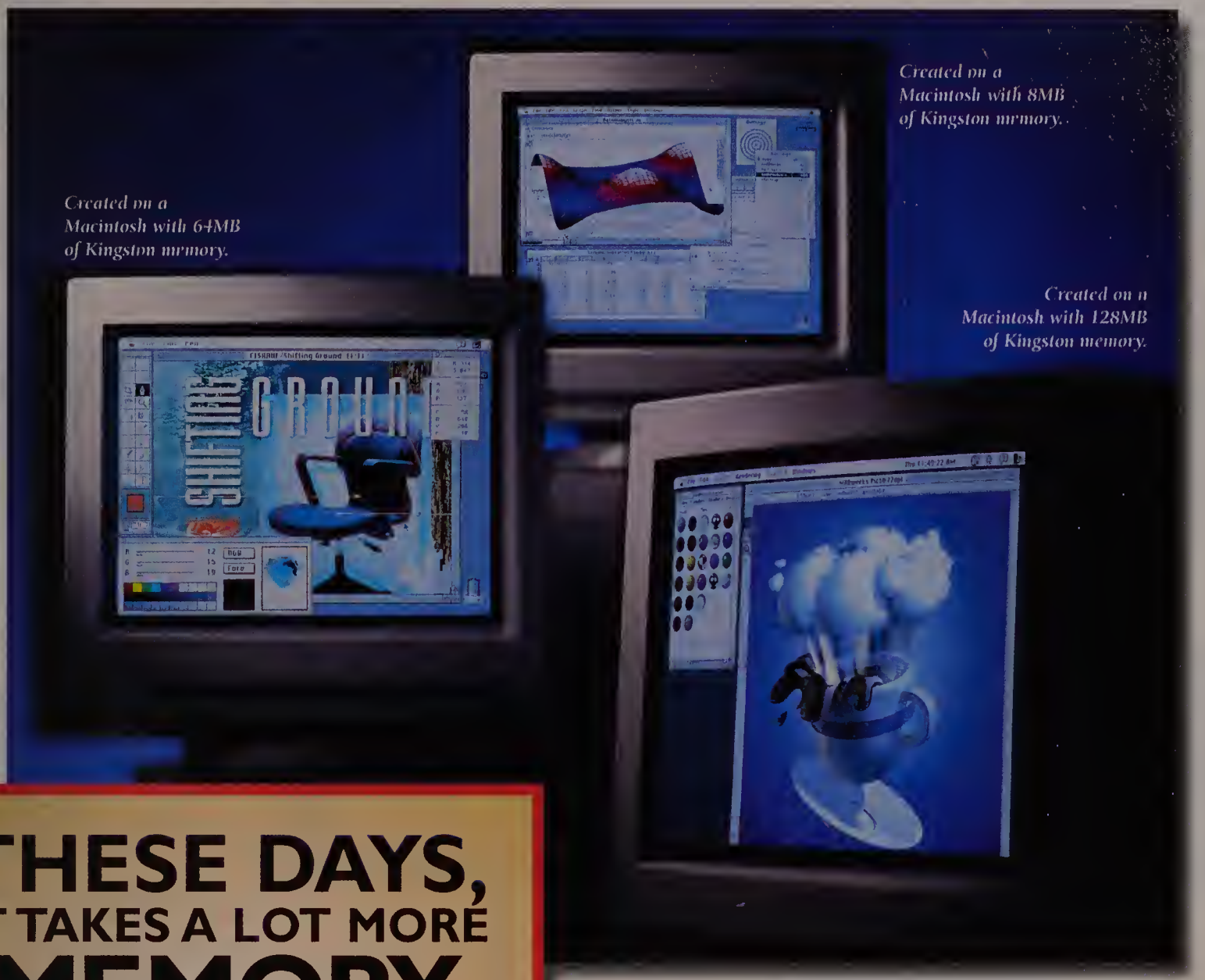
By automating a clever Webmaster's tip, DitherBox 1.0 lets you use thousands of color variations safely on the Web. HVS ColorGIF 2.0 offers significant power, but figuring out how to harness its strength can be difficult, especially when compared with competing products' ease of use.—JEFF CARLSON

DitherBox 1.0

RATING: ★★★★/8.6 **PROS:** Automates color grid, making for quick creation of thousands of Web-safe color combinations. **CONS:** Can't "paint" with hybrid colors, can only fill selections. **COMPANY:** RDG Tools (650/344-2505, *www.ditherbox.com*). **LIST PRICE:** $29.95.

HVS ColorGIF 2.0

RATING: ★★★/6.6 **PROS:** Excellent compression. **CONS:** Confusing, button-laden interface. **COMPANY:** Digital Frontiers (847/328-0880, *www.digfrontiers.com*). **LIST PRICE:** $99.



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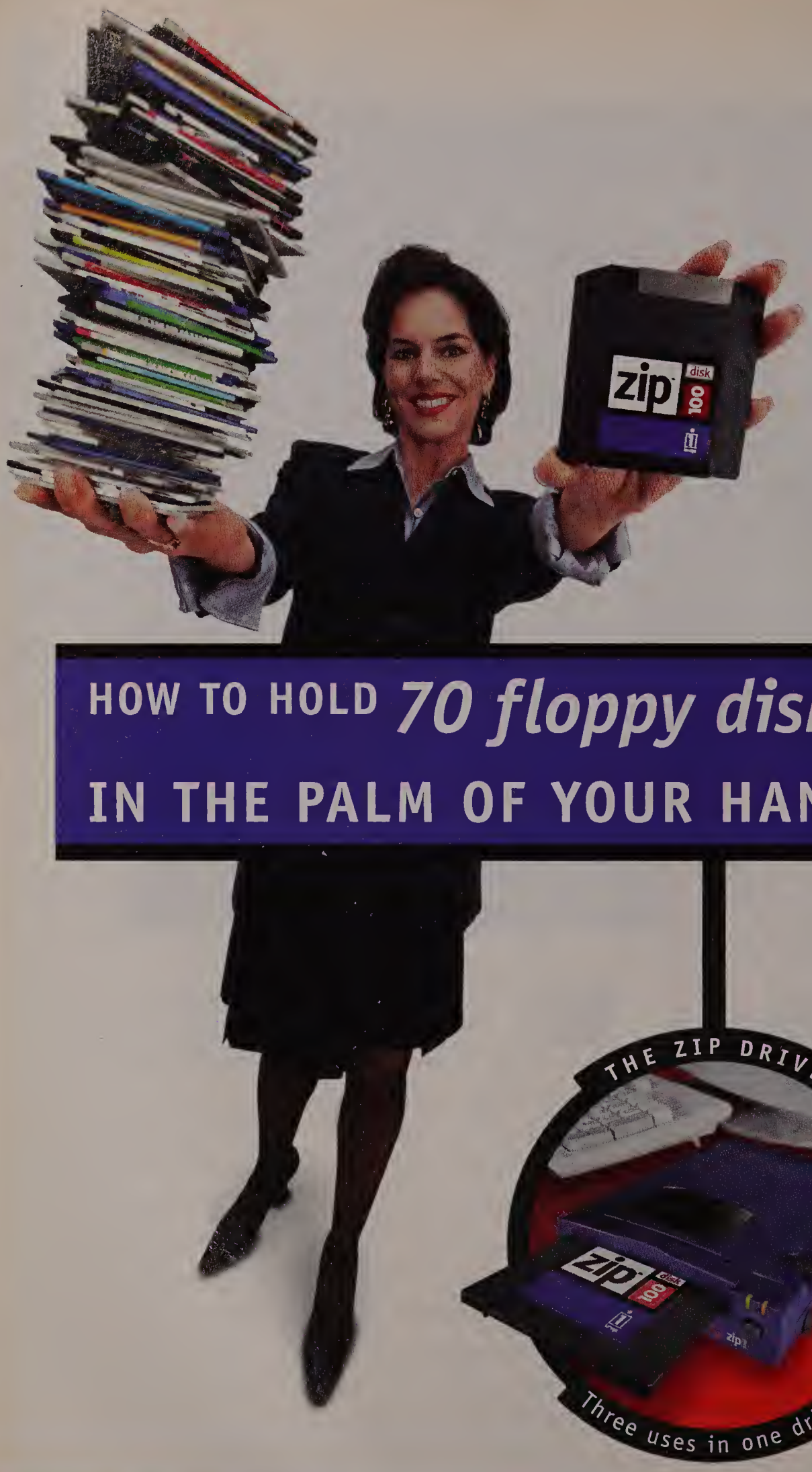
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BeyondPress 3.0

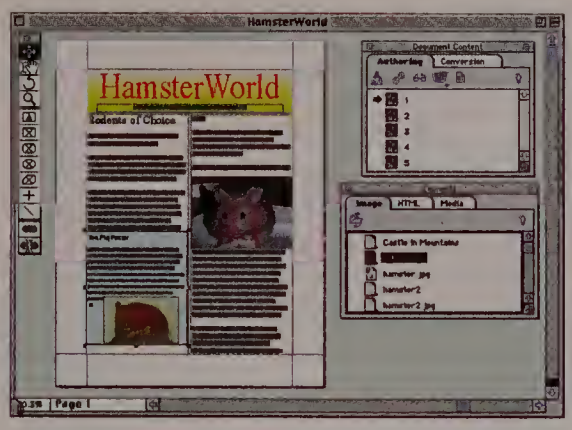
QUARK-TO-WEB XTENSION OFFERS LIMITED WYSIWYG WEB AUTHORING

BEYONDPRESS, THE TOOL OF choice for converting QuarkXPress documents into Web pages, gets a more refined interface, better HTML formatting options, and multimedia support in version 3.0. But the big news is that this plug-in now does more than convert *existing* QuarkXPress pages into HTML documents; it lets you create Web pages from scratch within QuarkXPress. The new version's document-conversion tools remain top-notch; however, the authoring features are limited and can yield somewhat unpredictable results.

BeyondPress 3.0 operates in two modes. In Document Conversion Mode, the program works as in previous versions: you selectively add text chains and graphic elements from your QuarkXPress document to the Document Content palette, which BeyondPress adds to the QuarkXPress interface. You can then drag those elements into any order, apply HTML style tags, and create links to other locations within the document or to other URLs. You can also drop in additional HTML elements before exporting the palette's contents as an HTML document. A helpful new Export Progress Palette shows the approximate file size and download time, as well as any problems BeyondPress encountered while exporting the file.

In the new Authoring mode, you don't pull out individual picture boxes and text boxes for conversion; instead, each page of your QuarkXPress document becomes one Web page. You use QuarkXPress's built-in typographic and page-layout tools to create a Web page, placing each picture and text box exactly where you want it to appear. When you export the page, BeyondPress grabs everything on it and uses HTML tables to create a Web page that closely resembles the one you designed in QuarkXPress.

While the idea of using QuarkXPress as a WYSIWYG Web authoring environment is appealing, this system has its flaws. For example, BeyondPress does an impressive job of approximating the original page layout, but it pulls this off by spitting out bloated HTML containing elaborate, hard-to-edit table grids. Table creation in QuarkXPress is a painstaking, laborious task that involves setting up properly spaced tabs; some elements don't convert properly; and overlapping picture and text boxes produce unpredictable results when exported.



Author, Author! BeyondPress 3.0's Elements palette stores images, multimedia files, and chunks of HTML that you can drag and drop onto Web pages, while the Document Content palette lets you switch between Conversion and Authoring modes.

But Astrobyte has done a good job of updating BeyondPress to keep up with current Web technologies. A new Elements palette lets you add live media—such as QuickTime movies, Java applets, and Shockwave animations—simply by dragging them onto a QuarkXPress page. Version 3.0 also supports the **<font face>** HTML tag, cascading style sheets, and Bitstream's TrueDoc technology, which preserves the fonts used in your Web pages. Of course, some of these technologies are of limited value to Web authors because only certain browsers support them; TrueDoc, for example, requires Netscape Navigator 4.0.

Macworld's Buying Advice

Improved though it is, BeyondPress 3.0 can't match a dedicated WYSIWYG authoring program for creating new Web pages. When it comes to extracting content from existing QuarkXPress documents, however, BeyondPress remains the best tool for the job.—JOSEPH SCHORR

RATING: ★★★★/7.6 **PROS:** Strong HTML formatting options; lets you create Web pages within QuarkXPress; supports a variety of media formats. **CONS:** Generates needlessly complex HTML; can't convert some QuarkXPress elements properly; expensive. **COMPANY:** Astrobyte (303/861-4861, *www.astrobyte.com*). **LIST PRICE:** $495.

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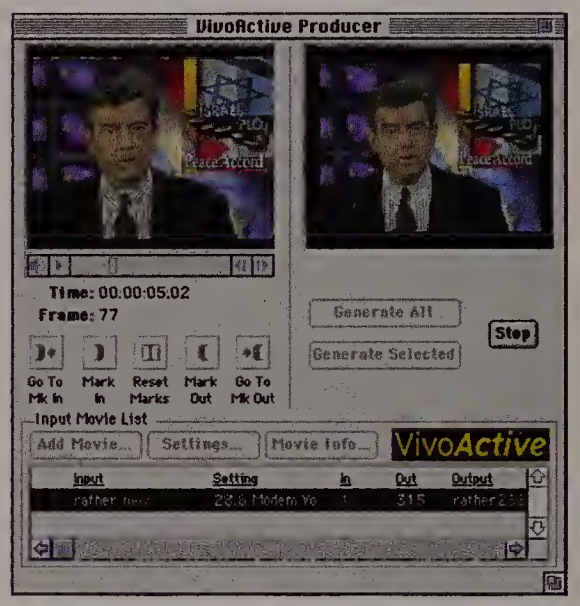
VivoActive Producer 2.0

SIMPLE UTILITY BRINGS STREAMING VIDEO TO SMALLER SITES

VIDEO CLIPS CAN ADD A NEW dimension to a Web site, but visitors can grow old waiting for huge clips to download. Streaming video clips, on the other hand, play as they download, and playback begins almost immediately. One tool for creating low-bandwidth streaming video and audio is Vivo Software's VivoActive Producer 2.0, a Power Mac–only utility that compresses QuickTime movies into VivoActive format. It's easy to use, the resulting clips play back smoothly, and—unlike most other streaming video formats—VivoActive doesn't require that you buy a specialized server to dish out your video clips.

VivoActive Producer is a cinch to use: simply select the QuickTime movie you want to convert, specify the target delivery speed, and click on a button to generate the clip. You can select from 21 presets offering various combinations of data-transmission speeds and quality settings. VivoActive Producer also lets you batch-compress a series of movies and create multiple versions of a movie, each designed for a specific delivery speed. The sound and video quality is surprisingly good, even at modem speeds.

Adding VivoActive clips to your Web pages is a simple matter of using the HTML **<embed>** tag along with a few attributes. (The excellent manual contains some examples to get you started.) To play the clips, your site's visitors must download and install the free VivoActive Player plug-in.



Rather Easy As it compresses a clip, VivoActive Producer displays before-and-after views.

VivoActive's biggest competitor is Progressive Networks' RealVideo (206/447-0567, *www.real.com*). Progressive gives its RealVideo encoder away and throws in an Adobe Premiere export module that lets you make RealVideo clips directly within Premiere and create video slide shows—something VivoActive Producer can't do. And the latest versions of the RealVideo encoder allow for HTTP streaming, although you still need a RealMedia server—starting at $1000—for reliable results.

Macworld's Buying Advice Ultimately, RealVideo remains a better choice for high-end streaming video. It provides a broader array of production options, and the RealMedia servers offer more reliable streaming in high-volume situations. But if your site is relatively small (or on an intranet) and you simply want to deliver streaming versions of your QuickTime clips, VivoActive Producer is an excellent alternative.—JIM HEID

RATING: ★★★★/7.8 **PROS:** Easy to use; excellent audio and video quality; good documentation. **CONS:** Fewer controls than RealVideo; expensive. **COMPANY:** Vivo Software (617/899-8900, *www.vivo.com*). **LIST PRICE:** $695.

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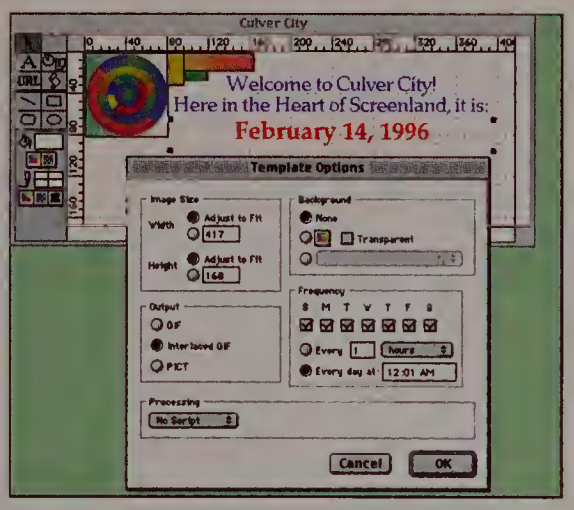
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WebCollage

AUTOMATIC WEB INFOGRAPHICS

STOCK TICKERS AND OTHER continuously updating informational graphics are a great way to keep visitors coming back to your Web site, but up till now creating them has been a job for experienced programmers. An innovative new program from StarNine Technologies is a boon to Web designers who want jazzier sites without the expense of custom Java or CGI programming. WebCollage 1.01 makes it easy to produce dynamic infographics that update themselves as often as you like and, once set up, require no further attention.

You create graphic templates in the well-designed WebCollage Editor, which looks at first glance like a familiar drawing program but sports a palette with tools for placing data fields (date and time, information from a URL, or one that runs a script) in the template. Once you've created the fields, the separate WebCollage Assembler fills them in by fetching data from the Internet or any source accessible via AppleScript or UserLand Frontier. The Assembler combines the data with the graphic template, saves it all as a GIF file, and uploads it to your Web server via FTP (or if the Assembler is running on the same machine as your Web server, puts it in the server folder). The Assembler's nicely implemented scheduling features let it refresh the images at any interval you specify.

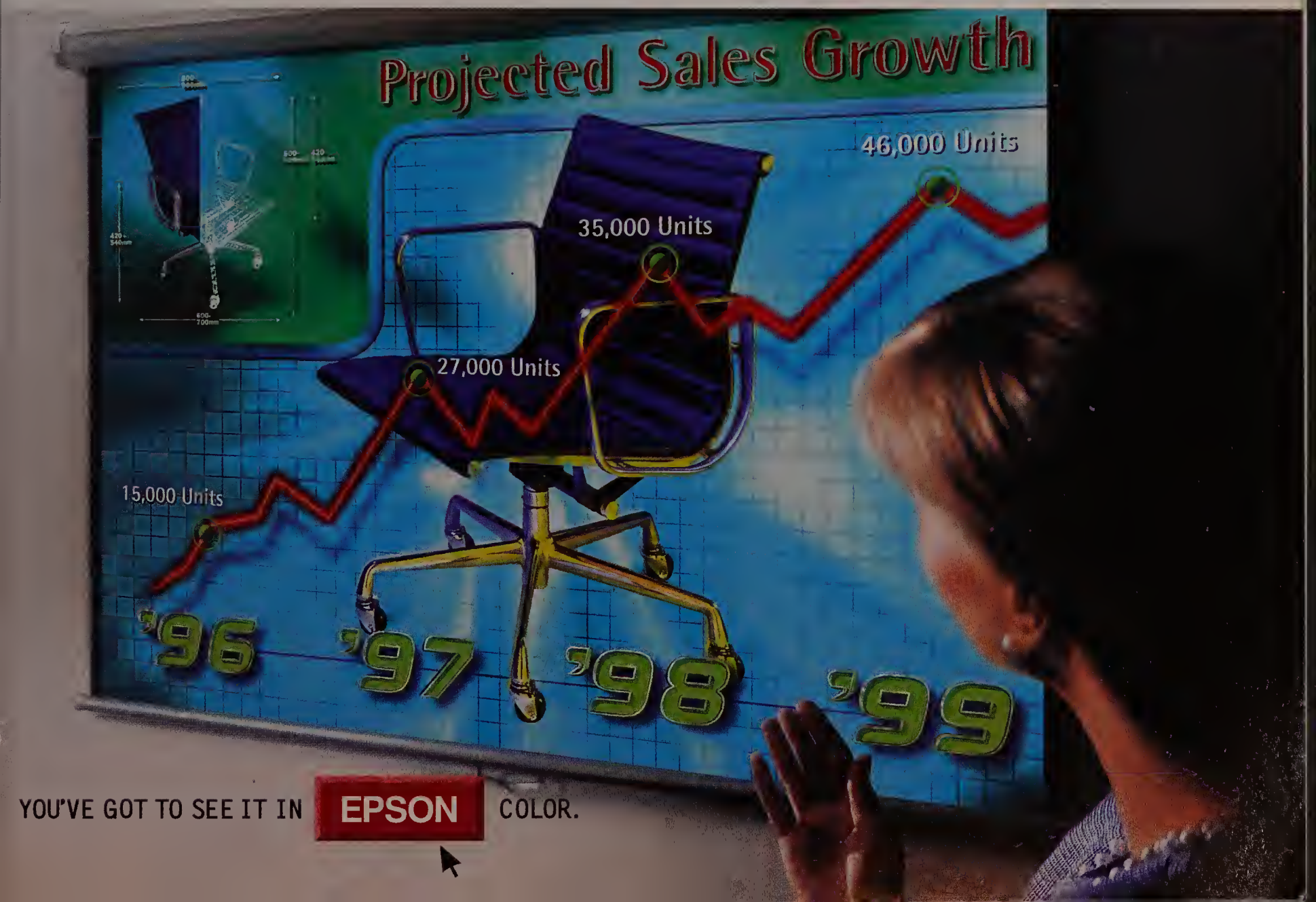


Date Collage WebCollage lets you determine how often your graphics will update. This simple display updates once a day, just after midnight.

Using the Editor's tool palette, you can display the current date and time or pull live information from virtually any URL and have it display in your graphic. WebCollage comes with sample templates for NASDAQ stock quotes, weather reports, news displays, countdowns, and other graphics. But the most interesting tool is the one that triggers scripts (though you needn't be a script maven to use WebCollage effectively; the powerful URL tool may be all you need for most dynamic graphics). You can use the scripting tool to grab data from Claris FileMaker Pro and build an online catalog that updates automatically whenever a price changes. Or you could write a script that gathers data from a ClarisWorks spreadsheet, graphs the results, and includes the graph in the generated GIF file. But although the scripting function is useful and versatile, assembling via scripts can be slow; for faster image assemblies, you're better off using Frontier instead of AppleScript.

Macworld's Buying Advice WebCollage is a fine addition to a Webmaster's toolbox, but at $249 it costs more than most Web authoring programs. If the price were low enough to make WebCollage an under-$100 impulse buy, it would be irresistible. As it is, it may be a luxury that only those with a pressing need for dynamic informational graphics can afford.—TOM NEGRINO

RATING: ★★★/6.9 **PROS:** Unique and innovative; easy to use. **CONS:** Pricey; building scripted graphics can be time-consuming. **COMPANY:** StarNine Technologies (510/649-4949, *www.starnine.com*). **LIST PRICE:** $249.

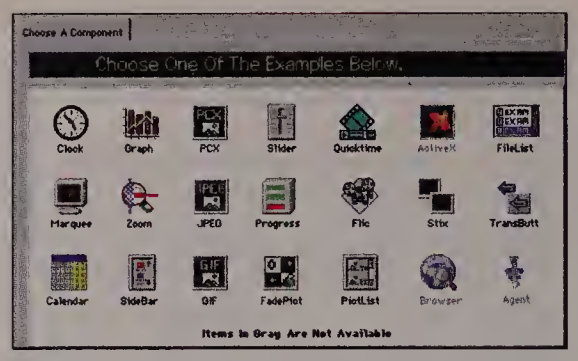


Omnis Studio

NEW WEB TRICKS FOR AN OLD FAVORITE

BLYTH INTRODUCED OMNIS MORE than a decade ago, when relational databases for the Macintosh were rare and cross-platform support was almost nonexistent. The company is now called Omnis Software, and its latest offering—Omnis Studio—combines key components of its Web programming package (Web RAD) with slick new code-organization tools. Not only can you build databases that connect mainframe SQL data to desktop Web browsers, you can produce identical Omnis applications that run on the Mac OS, Windows 95 and NT, and OS/2 (Unix support is expected later this year).

Omnis is organized around collections of objects—Omnis-code class hierarchies, ActiveX components, JavaBeans, and other third-party Web components (see "See Anything You Like?"). If you're thinking animated banners, sound effects, and other familiar Web-page effluvia, think again; Omnis lets you drag and drop active e-mail addresses and browser-readable tables directly into database forms and offers such Web essentials as TCP/IP sockets, FTP connections, and CGI scripting.



See Anything You Like? To cut development time for Web connection, Omnis Studio lets you drag and drop premade components from many sources.

Another selling point is a revamped scripting language for manipulating objects and controlling event flow. The cross-platform Omnis Script is powerful and accomplishes complex actions with only a few lines of code, although you're likely to find it somewhat cryptic—for example, **Do Objref .$edgefloat.$assign(kEFposnStatusBar)**—unless you're already familiar with Omnis conventions and know your way around relational constructs.

Omnis Studio makes it easy to construct the basics of a client-side database-query interface or a server-side relational database; you can check out Omnis's huge class libraries using the convenient object browser, or visit the Component Store for other usable code. PowerSoft and ACI US make many of the same cross-platform and rapid-development claims for their products, respectively PowerBuilder 5.0 (see *Reviews*, April 1997) and 4th Dimension 6.0 (see *Reviews*, August 1997), but this Omnis release is by far the fastest way to create Web-oriented enterprise databases. If you are writing an inventory program for your pet store, Claris FileMaker Pro may be a better bet. This point is underscored by the price of Studio and its add-ons: Data Access Manager, with tools for access to Oracle, Informix, Sybase, and Microsoft SQL servers, is $1299; Production Manager, for development-team version control, is $799.

Macworld's Buying Advice Omnis Studio is one of the few truly cross-platform tools for the enterprise market, and it gives experienced Omnis Mac developers a fast track both out to the Web and back into corporate SQL data mines. It's a rapid application development tool that really lives up to that title.—CHARLES SEITER

RATING: ★★★★/7.2 **PROS:** Elegant object and component design for fast deployment of reusable code. **CONS:** Not for database beginners. **COMPANY:** Omnis Software (415/571-0222, *www.omnis-software.com*). **LIST PRICE:** $1599.

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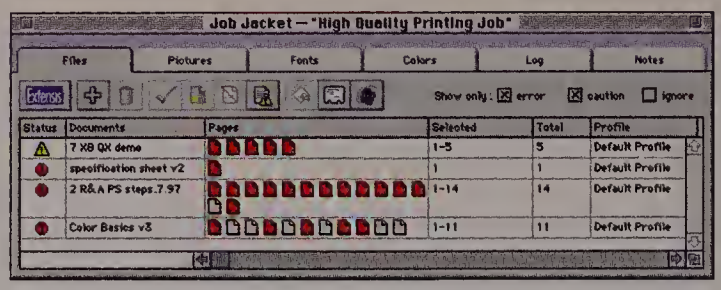
Preflight Pro

BULLETPROOF YOUR QUARKXPRESS FILES BEFORE PRINTING

SAVVY DESIGNERS AND PREPRESS operators know that *preflight*—a process akin to checking airplane instruments before takeoff—can save both time and money when preparing pages for print. Extensis's Preflight Pro is an easy-to-use tool that reports a QuarkXPress document's errors and lets you repair the problems within XPress.

One of Preflight Pro's highlights is a clear, simple interface that uses the printer's "job jacket" metaphor. Simply add one or more documents to the Preflight Pro Job Jacket list, then click on a button to inspect the document. Tabbed palettes in the Job Jacket let you see the status of fonts, images, colors, and so on.

After you inspect the document, Preflight Pro generates a report of problems—fonts that are available or missing, linked or unlinked high-resolution files, and RGB images, for example. You can then review and correct each error within QuarkXPress using Pilot, a Quark XTension. This tool is what makes Preflight Pro unique; other preflight programs, most notably Markzware Software's $399 FlightCheck, don't let you access pages and make changes to them within the page-layout application.



Job Jacket Preflight Pro's Job Jacket contains information on critical document components, such as fonts, images, and colors.

To collect the fonts and images for transport, you can place them in a folder, compress them into a self-extracting archive, or create a BinHex file. A convenient Collection Preview dialog box lets you add or remove files before collecting them.

Preflight Pro abounds with handy features, such as customizable profiles that define and save critical parameters for various page specifications and output devices. Three levels of warnings are available to notify the operator and indicate the severity of an error. An Inventory feature lists images, fonts, and colors used in one or more pages, and Job Tickets contain order, delivery, vendor, and transfer-media information as well as any special instructions. The program also offers unique information about pictures, such as their location on the disk, creation date, width and height, and clipping-path data. Clear, concise expert tips and problem-solving suggestions are strategically placed throughout the program to guide you through the preflight process. All that's missing is support for Adobe PageMaker, something Extensis plans to add to the next version (expected to ship later this year). The company is also putting the finishing touches on Preflight Designer, which is limited to inspection and collection tools and will sell for about $100.

Macworld's Buying Advice Preflight Pro is easy to use and well conceived, providing everything you need to prepare QuarkXPress pages for printing. Anyone who works with XPress files and wants them to print properly should own this tool.—JIM RICH

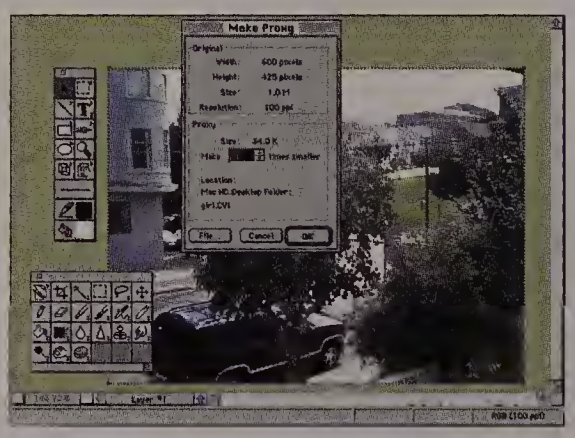
RATING: ★★★★/8.4 **PROS:** Easy to use; simple, effective user interface; lets operator make changes directly to QuarkXPress pages. **CONS:** Doesn't work with PageMaker. **COMPANY:** Extensis (503/274-2020, *www.extensis.com*). **COMPANY'S ESTIMATED PRICE:** $399.95.

Canvas 5.0.2

TONS OF TOOLS ADD UP TO AN ADEQUATE PACKAGE

AS AN ALL-IN-ONE APPLICATION that tackles painting, illustration, page layout, and presentation, Canvas 5.0.2 seems like a dream come true. In reality, though, this new version of Deneba's venerable graphics package includes a hodgepodge of new features and a huge assortment of clip art and fonts but fails to correct existing problems.

Canvas's main claim to fame has been its ability to mix vector and raster graphics, allowing you to combine line-art drawings and photographic art in the same image. Although Canvas has always made it possible to import and export an incredible number of file formats, version 5.0.2 finally adds GIF89a export, which lets you prepare files for the Web. You now can also manipulate raster images more quickly using Proxies—low-resolution duplicates of image objects that can be modified just like the real thing (see "Something New")—and a new transparency mask feature that lets you make part of a raster layer transparent. As in previous versions, you can create multipage documents with master pages.



Something New Canvas 5.0.2's Proxy feature lets you manipulate raster images more quickly by creating low-resolution duplicates of objects.

Although we've often praised its interface and integrated drawing and painting capabilities, Canvas has traditionally lagged behind Adobe Illustrator and Macromedia FreeHand in terms of high-end features (see "The Illustration Challenge," January 1997). Unfortunately, Canvas 5.0.2 still lacks support for pressure-sensitive strokes in vector objects, doesn't permit a gradient fill to span several objects, and is unable to create distinct path and fill patterns.

Canvas's image handling has other critical shortcomings. Raster objects cannot interact with one another using blend modes, nor can they contain various levels of transparency. The new transparency mask removes only a hard-edged area around a raster object; you cannot vary the opacity of a layer. Instead, you have to work with raster images in the 24 provided alpha channels—just like in the olden days of Adobe Photoshop (before version 3.0's Layers and Masks), when you had to composite all images within a single layer.

Macworld's Buying Advice Canvas lives in an uncomfortable limbo: its lack of support for high-end features makes it a poor choice for graphics professionals, but its interface is far too complex for newcomers. Canvas could be a suitable choice, however, for an artist on a budget—someone who needs a single program that can produce professional-looking output and who isn't daunted by spending a bit more time getting things done. Canvas 5.0.2 offers a lot for the money, but it lacks the best features and add-ons found in other graphics applications.—SHERRY LONDON

RATING: ★★★/5.9 **PROS:** Excellent assortment of features; generous clip art and fonts; cost-effective. **CONS:** Not as strong as standalone packages; key timesaving features missing. **COMPANY:** Deneba Software (305/596-5644, *www.deneba.com*). **LIST PRICE:** $599 (free upgrade from 5.0).



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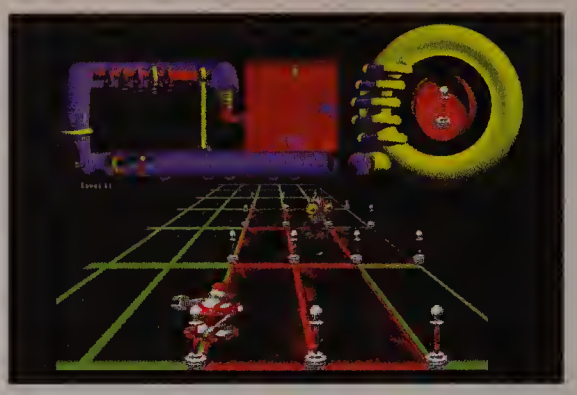
Gridz

DELIGHTFULLY BLENDS ACTION, STRATEGY

AS 3-D ACTION GAMES GET ALL the raves, the next revolution in computer gaming is quietly brewing, with developers breaking strategy games free from their each-player-in-turn shackles. So far, real-time strategy leaders Warcraft and Command and Conquer (see *Reviews*, May 1997) flaunt their hard-core wargame ancestry too proudly for casual players. But Gridz, from Green Dragon Productions, combines strategy with real-time action in an inviting, intoxicating blend.

Named for its playing field, Gridz features an expanse of cyberspace territory divided into rectangular blocks. Your objective: to destroy your opponents' home squares before they do the same to you. You act through robot intermediaries to achieve your goals: Builder robots capture territory by activating Nodes that you place at grid junctures, Hacker robots knock down other players' Nodes (thus depriving them of territory), and Striker robots destroy other players' robots.

Building these robots requires energy, which you generate by capturing territory.



40 Megabytes and a Mule A Builder trundles along, expanding your NetSpace territory.

The more NetSpace you own, the faster you generate energy, the faster you can build robots, and the faster you overwhelm and crush your competition. As an added strategic element, some grid squares contain tokens redeemable for more-capable robots at the end of a round.

Aesthetically, Gridz is a treat. The three robot categories (Builder, Hacker, and Striker) include a total of 15 different models, and each variety is painstakingly animated and imbued with a charming personality. Even in the middle of thick and furious action, you'll have no trouble figuring out which is which. Better yet, you'll be responding as much to sonic cues as to visual ones after just a few games.

Gridz proves fun for players at all levels. Early rounds leave you plenty of time to figure out the rules of the road and experiment. Later contests leave you breathless as you battle multiple opponents for control of larger playing fields. And parents should have no qualms about handing Gridz to their kids—there's conflict, but it's good-natured and cartoonish.

In fact, the only thing that's missing is other players. Gridz screams for network play, but the current version allows only one player to battle against the computer. Green Dragon representatives say they're working furiously on a version that allows for up to ten connections. The upgrade—due in October—will be free to registered users.

Macworld's Buying Advice Gridz refines the happy balance between strategy and real-time action found in Warcraft and similar offerings. For folks put off by the aggression of games like Quake and Doom, Gridz offers bite-size chunks of friendly head-to-head action seasoned with just the right amount of brainwork.—CAMERON CROTTY

RATING: ★★★★/8.8 **PROS:** Lighthearted, real-time strategy game; entertains and challenges. **CONS:** No network play . . . yet. **COMPANY:** Green Dragon Creations (601/473-4225, *www.greendragon.com*). **LIST PRICE:** $34.95.





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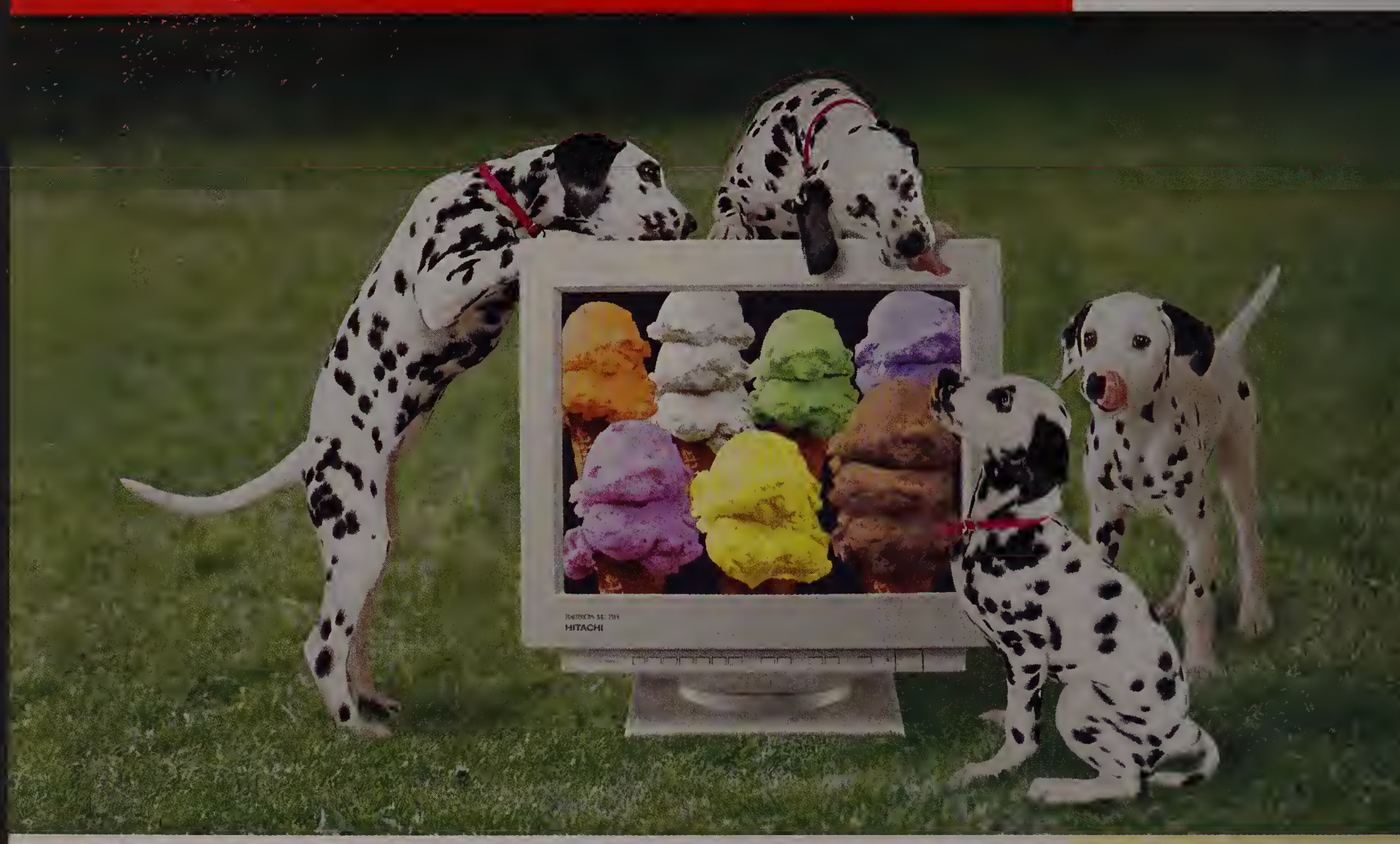
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Mac Superguide

MACWORLD SELECTS THE BEST MAC OS SYSTEMS

Edited by Allyson Bates

Looking for a new Macintosh? Confused about what new model to buy? Look no further. Each month, the *Mac Superguide* provides *Macworld*'s picks for the best Mac OS systems. Typically we recommend an Editors' Choice winner and two runners-up. Current recommendations, however, may have changed from last month's based on the present lineup and price changes.

You'll also find *Macworld* Star Ratings and Macworld Lab performance benchmarks for all Mac OS systems shipping as we went to press in late August 1997. You may read about other Mac models in *Macworld* and elsewhere, but those are prototypes not yet available—the only systems rated here are those you can actually buy.

For previously reviewed Mac systems, the summaries reference the issue date and page number of the article. In some cases, such as faster versions of existing Macs, there is no full review and thus no cross-reference. New systems are indicated in the benchmark by the ▶ icon.

Prices from Apple, Motorola, and Umax are company-estimated street prices. APS, DayStar, Power Computing, and PowerTools sell direct. Unless otherwise noted, all pricing includes a keyboard and mouse, but not a monitor or modem.

For price comparisons, estimate spending about $800 for a 17-inch monitor, $175 for a modem, $100 for an extended keyboard, $50 for a mouse, $400 for a 2GB hard drive, $175 for 2MB of VRAM, and $100 for 16MB of RAM.

OFFICE SYSTEM

EDITORS' CHOICE

★★★/6.5 **PowerCenter Pro 180** This affordable 180MHz Mac is superspeedy and has great features for all tasks, including an upgradable CPU and 3-D circuitry. It's this month's top pick for an office Macintosh, an ideal choice for midrange users. This configuration is upgraded from the base model, but is still quite affordable. Subtract $100 for the desktop version. Power Computing (512/388-6868): $1914, 604e, 32MB RAM, 1MB cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 16× CD, 2 free drive bays, 3 PCI slots. *Aug 97, p. 48*

EDITORS' CHOICE

★★★/5.9 **Power Macintosh 7300/200** Apple's 7300/200 is a great buy for any office environment. It's only $300 more than the less powerful Power Mac 7300/180 and it offers a nice performance boost. It's a strong performer that's competitively priced and easily expandable. Apple Computer (408/996-1010): $2299, 604e, 32MB RAM, 256K cache, 2MB VRAM (4MB maximum), 2.0GB hard drive, 12× CD, 1 free bay, 3 PCI slots. *May 97, p. 100*

★★★/5.6 **SuperMac J700/180** Shopping for a new office Mac? Umax's price drops make it an even better purchase. Plus it has one more PCI slot, one more free drive bay, and more cache than the 7300/200. Umax Computer (510/226-6886): $2099, 604e, 16MB RAM, 512K cache, 2MB VRAM (4MB maximum), 2.1GB hard drive, 8× CD, 2 free drive bays, 4 PCI slots. *May 97, p. 100*



Not only is Apple's Power Mac 7300/200 affordable, but it's easily expandable too.

PORTABLE SYSTEM

EDITORS' CHOICE

★★★★/7.2 **PowerBook 3400c/240** It's almost twice as fast as a top-of-the-line Pentium portable and costs just a little more. However, the 3400c isn't perfect: it's expensive, it doesn't support multiple monitors, and its CPU isn't upgradable. Apple Computer (408/996-1010): $5500, 603e, 16MB RAM, 3.0GB hard drive, 12× CD, 12.1-inch active matrix LCD, 1 drive bay, 2 PC Card slots. *May 97, p. 50*

★★★/6.1 **PowerBook 1400c/133** This midrange notebook has an optional CD-ROM drive and a large active matrix LCD panel. It's more affordable and a better system than the old PowerBook 5300 series. And with a 133MHz CPU, this notebook can literally serve as a desktop replacement. Apple Computer (408/996-1010): $3000, 603e, 16MB RAM, 1.3MB hard drive, optional 8× CD, 11.3-inch active matrix LCD, 1 drive bay, 2 PC Card slots ($2500 model 1400cs/133 has passive matrix LCD and 1.0GB hard drive). *Jan 97, p. 58*

★★★/5.8 **PowerBook 2400c/180** Apple's new 4.3-lb. subnotebook is no heavyweight, but it holds its own. If you can live with the keyboard's shortcomings, you will love the 2400c. A slim AC adapter and tiny external floppy drive make it light as a feather for travelers. $3500 isn't cheap, and you'll need to add at least a 32MB RAM card, but it's unquestionably a great Mac. Apple Computer (408/996-1010): $3500, 603e, 16MB RAM, 256K cache, 1.3GB hard drive, 10.4-inch active matrix LCD, no bays, 2 PC Card slots. *Nov 97, p. 50*

SMALL-OFFICE/HOME-OFFICE SYSTEM

EDITORS' CHOICE

★★★/6.7 **StarMax 5000/300 MT** Motorola recently discontinued its StarMax 3000 and 4000 lines. Now the great performance and features of the 5000/300 are offered in other speeds and configurations. This 300MHz Mac is still an Editors' Choice for home and small office use. Motorola pumps top speed and features into an affordable computer. Its speed ties that of many 604e-based computers, and its Iomega Zip drive, 4GB hard drive, and 16X CD-ROM drive complement the nice feature set. Consultants and small businesses will enjoy this feature-rich tower. Motorola Computer Group (800/759-1107): $2899, 603e, 32MB RAM, 512K cache, 4MB VRAM (8MB maximum), 4.3GB hard drive, 16× CD, 3 free drive bays. 5 PCI slots, Zip drive. *Sep 97, p. 60*



The StarMax 5000 line added new CPU speeds—but the 300MHz is still our SOHO choice.

EDITORS' CHOICE

★★★/6.5 **PowerBase 240** It's slower than the StarMax 5000 but still has a great price/performance ratio. The 240's pro-level performance, strong feature selection, and greater expandability hold its Editors' Choice title in the SOHO category. Now offering a $100 rebate. Power Computing (512/388-6868): $1599, 603e, 16MB RAM, 256K cache, 2MB VRAM (4MB maximum), 2.0GB hard drive, 8× CD, 3 free drive bays, 3 PCI slots. *May 97, p. 100*

continues

REAL PRODUCTS REAL RATINGS Reviews you can trust: Unlike other publications, Macworld rates only final shipping products, not prototypes. What we review is what you can actually buy.
Outstanding ★★★★★ = 9.0–10.0 Very Good ★★★★ = 7.0–8.9 Good ★★★ = 5.0–6.9 Flawed ★★ = 3.0–4.9 Unacceptable ★ = 0–2.9

★★★/6.2 **SuperMac C600x/280** With 1MB of in-line cache, the C600x moves into the top class of 603e performers. Since Umax shaved some dollars off the price, the C600x/280 is an even better buy. This is one of the first 603e Macs with an upgradable CPU, but users will want more VRAM and PCI slots. Umax Computer (510/226-6886): $2395, 603e, 32MB RAM, 1MB cache, 2MB VRAM (2MB maximum), 4GB hard drive, 12× CD, 4 free bays, 1 free PCI slot. *Oct 97, p. 48*

★★★/6.1 **Power Macintosh 6500/225** This decent SOHO alternative has cool features—even a Zip drive. But the 225 is hardly upgradable. Recent price cuts make this Mac even more affordable for the home or small business user. Apple Computer (408/996-1010): $1799, 603e, 32MB RAM, 256K cache, 1MB VRAM (1MB maximum), 3.5GB drive, 12× CD, no free drive bays, 2 PCI slots, 33.6-Kbps modem. *Aug 97, p. 52*



The versatile PowerTower Pro 225 works wonders as a publishing or graphics Mac.

EDUCATION SYSTEM

EDITORS' CHOICE

★★★/6.7 **Power Macintosh 5500/225** It's a shame that this all-in-one Mac is available only to schools. The 5500/225 boosts performance in the education market by offering rich features and a fast CPU at a reasonable price. Same case, convenience, and price as the old 5400's, but with more power and 3-D capabilities. Apple Computer (408/996-1010): $1999 (only sold to schools), 603e, 16MB RAM, 256K cache, 2MB VRAM (2MB maximum), 2.0GB hard drive, 12× CD, no free drive bays, no PCI slots; Ethernet card, internal stereo speakers, monitor included. *Aug 97, p. 52*

EDITORS' CHOICE

★★★/5.9 **PowerBase 200** It's fast, cheap, and expandable, with 3-D video acceleration. This 200MHz Macintosh is Power Computing's base processor speed for the PowerBase line. A great buy for cash-strapped schools and students. Take off $100 if you buy this summer. Power Computing (512/388-6868): $1399, 603e, *continues*

Macworld LAB TEST

Every Shipping Mac Tested and Rated

To help you make the right buying decision, Macworld re-rated all shipping Macs according to our new SpeedMark and categorized systems in Professional, Consumer, and Portable categories. New scores have been adjusted proportionally to reflect anticipated technological developments for the following year. Longer bars are better. Core results are times as fast as an Apple Power Macintosh 7100 (7100 = 1.0). Only shipping systems are tested and rated.

Longer bars are better. Editors' Choice winners' names are in red. ► New. An Apple Power Macintosh 7100/80 has a SpeedMark score of 1.0.

	SpeedMark	Star Rating*
Professional Category		
Apple Computer		
Power Macintosh 7300/180	2.4	★★★/5.8
Power Macintosh 7300/200	2.6	★★★/5.9
Power Macintosh 8600/200	2.7	★★★/6.5
Power Macintosh 9600/200	3.1	★★★/6.7
Power Macintosh 9600/200MP	2.9	★★★/6.2
Power Macintosh 9600/233	3.3	★★★/6.6
APS Technologies		
MPower 604e200	2.6	★★★/5.9
DayStar Digital		
Genesis MP 800+	3.1	★★★/6.0
Genesis MP 900+	3.2	★★★/5.7
► Genesis MP 932+	3.4	★★★/5.9
Power Computing		
PowerCenter Pro 180	2.9	★★★/6.5
PowerCenter Pro 210	3.2	★★★/6.4
PowerTower Pro 225	3.4	★★★/6.4
PowerTowerPro 250	3.6	★★★/6.2
PowerTools		
Infiniti 4200GT Smart	2.7	★★★/6.2
Umax Computer		
SuperMac J700/180	2.7	★★★/5.6
SuperMac S900/200	3.1	★★★/6.6
SuperMac S900/200DP	2.8	★★★/6.1
SuperMac S900/225	3.1	★★★/6.4
SuperMac S900/233	3.2	★★★/6.5
SuperMac S900/250	3.5	★★★/6.3
SuperMac S900/250DP	3.3	★★★/6.2
Consumer Category		
Apple Computer		
Power Macintosh 4400/200	1.9	★★★/5.5
Power Macintosh 5500/225**	2.1	★★★/6.7
Power Macintosh 6500/225	2.1	★★★/6.1

	SpeedMark	Star Rating*
Power Macintosh 6500/250	2.2	★★★/6.0
Power Macintosh 6500/275	2.4	★★★/5.9
Power Macintosh 6500/300	2.5	★★★/5.9
APS Technologies		
MPower 603e200	1.7	★★★/5.2
MPower 603e240	1.9	★★★/5.7
Motorola Computer Group		
► StarMax 5000/225 MT	2.2	★★★/6.5
► StarMax 5000/275 MT	2.5	★★★/6.3
StarMax 5000/300 MT	2.7	★★★/6.7
Power Computing		
PowerBase 200	1.8	★★★/5.9
PowerBase 240	1.9	★★★/6.5
PowerTools		
Infiniti 3200GT Smart Bundle	2.0	★★★/5.8
Umax Computer		
► SuperMac C500 LT/200	1.7	★★★/5.4
SuperMac C600/200	1.8	★★★/5.1
SuperMac C600/240	1.9	★★★/5.0
SuperMac C600x/240	2.4	★★★/6.0
SuperMac C600x/280	2.5	★★★/6.2
Portable Category		
Apple Computer		
PowerBook 1400c/133	1.0	★★★/6.1
► PowerBook 2400c/180***	1.6	★★★/5.8
PowerBook 3400c/180	1.7	★★★★/7.0
PowerBook 3400c/200	1.8	★★★★/7.1
PowerBook 3400c/240	2.0	★★★★/7.2

**Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) **Available only to educational institutions. ***Configured and tested with Mac OS 8.*

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CBS Sportsline used Director 6 to create their addictive, intensely interactive 3-Point Shootout for precisely those reasons. With intuitive drag and drop programming, streaming sound and incomparable features and versatility, Director is the tool of choice for immersive online development.

MSN Australia used Flash 2 to design their Expedition Reefbound site, an interactive experience complete with animation, sound and rollovers. Flash generates extremely small files and streams them over the web for an immediate on-line experience. All without programming.

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16MB RAM, 256K cache, 2MB VRAM (4MB maximum), 2.0GB hard drive, 8× CD, 3 free drive bays, 3 PCI slots. *May 97, p. 100*

IMAGE-EDITING AND 3-D GRAPHICS SYSTEM

EDITORS' CHOICE

★★★/6.4 **PowerTower Pro 225** This expandable tower is ideal for all-around image editing. A multiprocessor-based Mac is faster for some key operations, but the 225 is faster and cheaper. Plus Power Computing's summer sale offers 128MB of RAM for a bargain price. Power Computing (512/388-6868): $3594, 604e, 32MB RAM, 1MB cache, 8MB VRAM (8MB maximum), 2.0GB hard drive, 16× CD, 6 free drive bays, 6 PCI slots. *Jun 97, p. 108*

EDITORS' CHOICE

★★★/6.0 **Genesis MP 800+** The ultimate Mac system is an Editors' Choice for image editing and 3-D graphics. It speeds through programs such as Adobe Photoshop and leaves plenty of room for upgrades. DayStar Digital (770/967-2077): $4999, 604e, 32MB RAM, 512K cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 16× CD, 7 free drive bays, 6 PCI slots. *Jun 97, p. 108*

PUBLISHING AND DESIGN SYSTEM

EDITORS' CHOICE

★★★/6.4 **PowerCenter Pro 210** Power Computing is redefining affordable with the PowerCenter Pro 210. Recent price cuts make this Mac an even better deal. It costs less than high-end Macs with similar specifications, but it's a bit slower. Order this summer, you get 64MB of RAM free. Power Computing (512/388-6868): $2344, 604e, 32MB RAM, 1MB cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 16× CD, 2 free drive bays, 3 PCI slots. *Aug 97, p. 48*

EDITORS' CHOICE

★★★/6.4 **PowerTower Pro 225** The low price, high overall performance, and plush feature set make this tower a great purchase for publishing pros. And right now it's at a superlow price. Power Computing (512/388-6868): $3594, 604e, 32MB RAM, 1MB cache, 8MB VRAM (8MB maximum), 2.0GB hard drive, 16× CD, 6 free drive bays, 6 PCI slots. *Jun 97, p. 108*

★★★/6.4 **SuperMac S900/225** Umax shaved a few bucks off the soon-to-be-discontinued S900/225, making it a better value for publishing and designing professionals. It's nearly as fast as the PowerTower Pro 225, but with fewer free bays. It's still a solid choice if you're shopping for an expandable, fast Macintosh. Keep an eye out for Umax's new S910 line that will soon be replacing the SuperMac S900 series. Umax Computer (510/226-6886): $3499, 604e, 32MB RAM, 512K cache, 8MB VRAM (8MB maximum), 2.1GB hard drive, 8× CD, 4 free drive bays, 6 PCI slots. *Jun 97, p. 108*



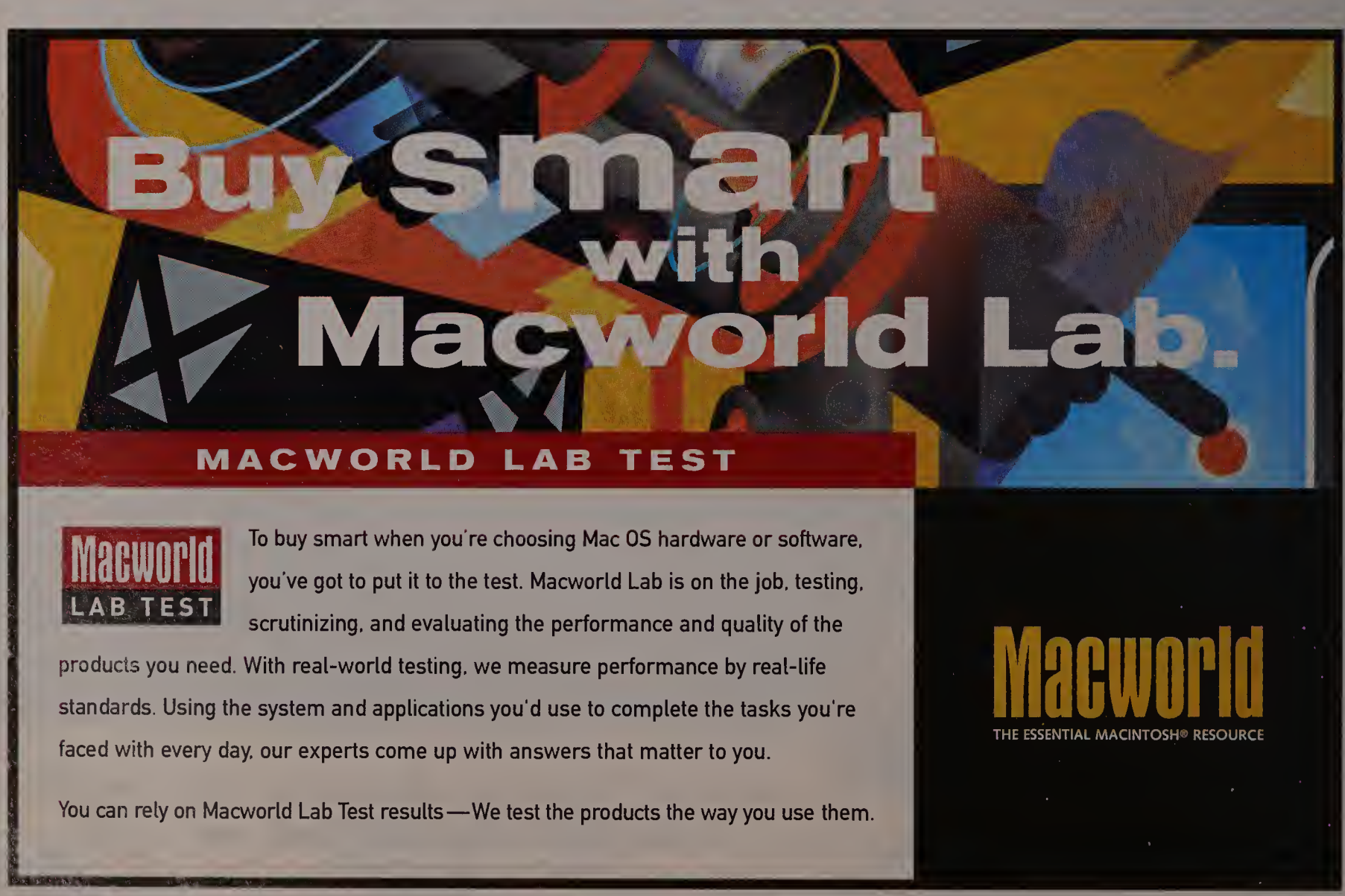
The Genesis MP 800+ is a perfect combination of solid design and great performance.

MULTIMEDIA AND VIDEO-CREATION SYSTEM

EDITORS' CHOICE

★★★/6.0 **Genesis MP 800+** This expandable Mac speeds through multiprocessor (MP)–enabled programs such as Adobe Premiere. Its four 604e/200MHz CPUs can handle complex video creation, and there's plenty of room for upgrades, with 12 RAM slots and seven drive bays. DayStar Digital (770/967-2077): $4999, 604e, 32MB RAM, 512K cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 16× CD, 7 free drive bays, 6 PCI slots. *Jun 97, p. 108*

★★★/6.5 **Power Macintosh 8600/200** A clever, unique case takes the pain out of upgrading the Power Mac 8600/200. Green-colored handles, levers, and buttons make it easy to get inside the box. Novice video creators will enjoy the cool built-in video, but serious multimedia gurus may be disappointed with the minimal three PCI slots. Apple Computer (408/996-1010): $2999, 604e, 32MB RAM, 256K cache, 2MB VRAM (4MB maximum), 2.0GB hard drive, 12× CD, 1 free drive bay, Ethernet card, built-in video. *Aug 97, p. 50* m



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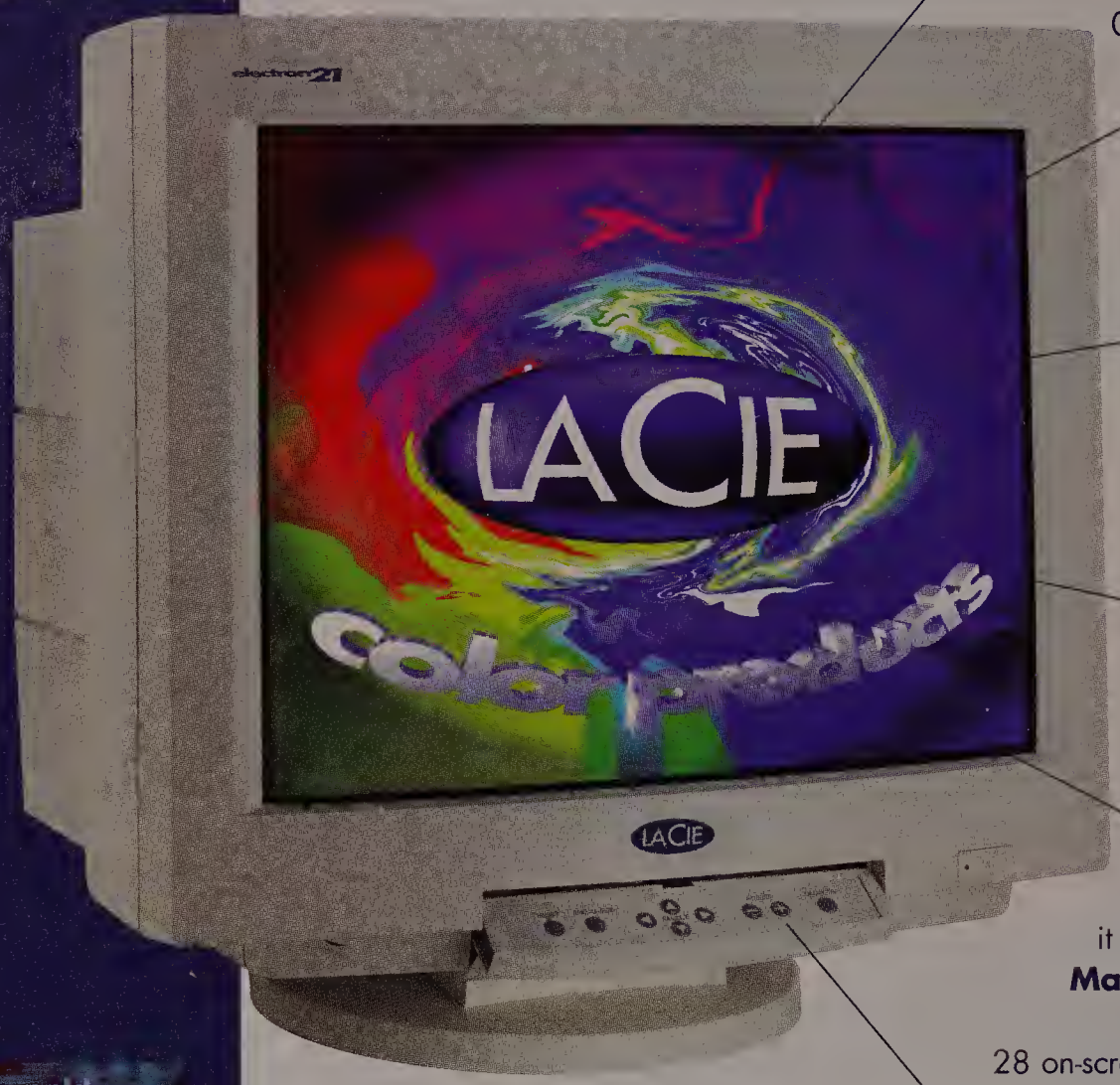
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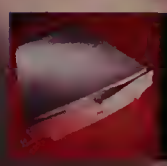
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Macworld LAB TEST



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PAGE 107 **Tweak It** Image editors sharpen your best shots



PAGE 115 **Print It** Color printers deliver vibrant results

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11 digital cameras under $600 capture hot shots

by John Goddard

SNAP IT

UNTIL NOW I'd never seriously considered buying a digital camera. The good ones were just too expensive. Earlier this year, decent entry-level digital cameras cost about $800—roughly as much as a fairly fancy film camera or a high-end camcorder. Now those same cameras—and their successors—are under $600, while they store more images and pack more features.

I'm still not ready to give up my 35mm camera—digital cameras don't yield those great razor-sharp images—but these sub-$600 cameras are unbeatable for quickly creating images and getting them into your computer to manipulate and put to use. Suddenly I'm finding all kinds of purposes for digital photos: to enhance my e-mail and my Web page, to document valuables for insurance, to preview choice offerings at a garage sale.

Digital cameras are a rapidly developing category, so consider this roundup a snapshot in time. To give you a view of what's available—as well as a guide to what to look for as digital cameras evolve—Macworld Lab tested 11 digital cameras priced from $199 to $599. We examined the overall design and feel of each camera, compared image capacities and download speed, and of course looked closely at image quality.

When you're checking out a new camera, first notice how it feels in your hand—and on your body. Is it portable enough to fit in a fanny pack or slip comfortably into a coat pocket? Toting these cameras around San Francisco, I was put off by the 1-pound metallic bulk of the Konica Q-EZ (*www.konica.com*). It's the only camera in this bunch that isn't stylishly compact. In contrast, Konica's Q-mini fit nicely into my jacket pocket.

Next examine a camera's controls and indicators, such as those for battery level, picture counting, and exposure compensation. Controls should be arranged logically and let you easily override features such as a self-timer or a flash.

For example, the Agfa ePhoto 307's (*www.agfa.com*) tiny top-mounted control panel shows how many shots you've taken and how many remain. With two button presses you can easily adjust the exposure and flash level. Compare that with Eastman Kodak's DC20 (*www.kodak.com*), which has three indicator lights (power, busy, erase) and is otherwise devoid of controls except an Erase button that's precariously close to the Power button.

LCD or Viewfinder?

Generally, digital cameras that cost less than $400 offer a simple glass viewfinder next to the lens. More expensive models usually have a color LCD screen in the back that, unlike a viewfinder, shows you *exactly* what the lens sees.

The difference between the two can affect the accuracy with which you compose shots, enabling you to avoid surprises such as a wayward thumb. An LCD also lets you review your pictures on the spot without connecting the camera to a Mac, so you can decide immediately whether to save or erase your shot.

The best LCD screens display the scene smoothly as you compose the shot. Of the eight LCD-equipped cameras we tested, the action on screen was most fluid on the Apple QuickTake 200 (*www.apple.com*), the DS-7 from Fuji Photo Film (*www.fujifilm.com*), and the Olympus D-200L (*www.olympus.com*). Swing the camera left, right, up, or down—the motion on screen displays at a smooth and consistent 30 frames per second. In con-

Digital Proof Sheet

When it comes to image quality, no digital camera gets it just right. We photographed this still life from the same distance with each camera, using best-quality setting. We scaled the images (shown at 300 dpi) identically; their sizes vary because different cameras capture different amounts of data.

The Olympus D-200L and Agfa ePhoto 307 shoot the sharpest pictures, but the mint-green background and vase in our test still-life appear pale blue. The Apple QuickTake 200, Fuji DS-7, and Konica Q-EZ and Q-mini cameras produce more accurate color output, but higher levels of JPEG compression reduce pixel details and soften the images.

Most digital cameras capture images at a similar resolution. Some cameras use a higher-quality lens and charge-coupled device—the camera's retina—to capture images with more detail than less capable models. For example, the output from the D-200L is sharper than the Q-mini's.

For a real-world comparison, we compared the results with prints that were made from shots taken with a disposable camera and a 35mm film camera, then scanned with the 600-dpi Umax Astra 600S (see the feature "Scan It," in this issue, for more on this and other under-$500 scanners).



Scanned Image This scanned image (shown for comparison) is a photo taken with a 35mm film camera. The image has a mistakenly blue background, blown-out highlights on the silver bracelet, and blurring from the scanning process.



Agfa ePhoto 307 The image detail is surprisingly crisp for a no-frills $299 camera. Despite blown-out highlights on the watch, and a slight blue shift in the background, the images look very good.



Casio QV-100 The image quality is poor. The shot is underexposed and marred with JPEG artifacts throughout. Reddish tones are missing in the soap bar; the light green background and vase mistakenly appear as bright blue.



Epson PhotoPC 500 Image sharpness is similar to that from the less costly Agfa, which uses many of the same parts, including the lens. Note the slight blue hue to the green vase. Highlights in the clock and silver bracelet are too bright.



Kodak DC25 The distracting violet cast and JPEG artifacts in the framed photo were not visible on the camera's LCD screen. Image quality is poor. This camera supports removable PC Cards for extra storage.



Konica Q-EZ Despite garish warm colors and blurry details, this bulky camera rendered the colors reasonably well. This camera lacks an LCD display.

trast, the Konica Q-mini, the Casio QV-10A and QV-100 (*www.casio.com*), and the Epson PhotoPC 500 with its optional LCD (*www.epson.com*) jumped like Neil Armstrong on the moon.

The downside to an LCD is its porcine appetite for batteries and a tendency to become washed-out in very bright sunlight. To compensate for the latter, the QuickTake 200, DS-7, QV-10A, QV-100, and Q-mini LCDs have brightness controls; however, I had better luck cupping my hand over the screen.

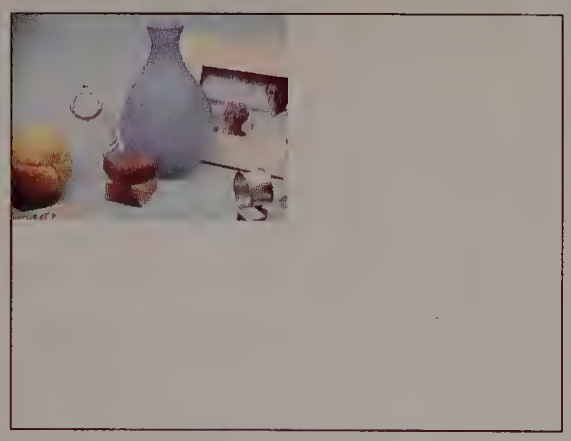
Images look deceptively gorgeous on a tiny LCD. Once you've downloaded the shots to a hard drive, it's easy to spot their blemishes: chunky pixels (artifacts of compression), underexposed shadows, and overexposed highlights. So don't judge picture quality by what you see on a 1.8-inch LCD. If you're comparing digital cameras in a store, insist on downloading a few pictures to a computer so you can see how images look on a monitor.

Vagaries of the Viewfinder

Viewfinders have two advantages over LCDs: they don't drain batteries, and you can see shots even in bright sunlight. The



Apple QuickTake 200 The hues in the green background paper and vase are close to accurate. The highlight and shadow areas of the orange are also well exposed. However, you'll need to sharpen shots with the bundled image editor.



Casio QV-10A Among the numerous problems with this shot are JPEG artifacts in the framed photo, missing reds in the soap bar, and stark contrast and low resolution overall.



Fuji DS-7 Nearly identical to the Apple's output, this shot's background and vase colors come closest to what we saw. The overall exposure is very good, but details are blurred. Fuji's download utility also is less intuitive than Apple's.



Kodak DC20 Shots from this tiny camera produce acceptable exposure, but the dull colors and JPEG artifacts in the background are distracting. It has a glass viewfinder rather than an LCD display.



Konica Q-mini Hues are fairly accurate on the vase and green background. Although shots looked great on the pint-size camera's LCD screen, the downloaded shots are disappointingly hazy.



Olympus D-200L Very crisp detail and good exposure of the orange and framed picture offset a slight blue tint to the green background. Too bad you can't upgrade the camera's image capacity.

disadvantage of viewfinders is that since they're set above or off to the side of the lens, they give you a slightly skewed view of what the camera sees. Tightly composed shots may not look exactly as you remember them. For example, I ticked off shots of a batch of daisies with the Q-EZ as close as an inch and a half away, carefully composing each shot in the viewfinder. Because the Q-EZ's viewfinder is above the lens, I unknowingly cut off the tops of the flowers.'

Of the cameras we tested, only three—the ePhoto 307, the Q-EZ, and the DC20—lack an LCD display option, constraining you to compose your shots solely from a glass viewfinder. The QuickTake 200, PhotoPC 500, Kodak DC25, and D-200L all give you the flexibility of having both.

10 Sure-Shot Tips

LIGHTING

1 Digital cameras nab the best shots in subdued light. In bright sunlight and under bright artificial light, digital images tend to get washed out in highlight areas. Look for shade or turn your subject's face from the sun. If your subject is against a bright background, set the flash to fill-in or (if possible) increase the exposure one notch.

2 Although many digital cameras lack a flash, they are highly sensitive to infrared light. Most cameras let you adjust the exposure—via buttons or on an LCD panel—so the camera can nab shots in dimly lit settings.

COMPOSITION

3 Compensate for viewfinder shift by framing shots slightly in the opposite direction of the lens. For example, if the lens is to the right of your viewfinder, compose the shot slightly to the left.

4 If the camera has an LCD screen, review the images after a few shots to make sure you're capturing what you want.

5 If shots are going with text on a Web page, compose vertically so they will fit more easily.

6 Digital-camera images have low resolution (72 to 152 pixels per inch), so they are less malleable than high-resolution scans. To get more detail in your shot, move closer to your subject.

EXTRAS

7 Even the best digital images can look just a little bit soft. Use the image editor bundled with the camera to sharpen your favorite shots.

8 Slow downloads? Check the advanced options in the camera's software and make sure the settings are the fastest your Mac supports.

9 Have lots of batteries handy and buy an AC adapter if your camera doesn't come with one.

10 If your camera lets you take close-ups, you can rephotograph your favorite old pictures and e-mail them or post them on a Web page.

Snap Facts: Digital Cameras under $600 Compared

Company	Agfa	Apple	Casio	Casio	Eastman Kodak	Eastman Kodak
Product	ePhoto 307	QuickTake 200	QV-10A	QV-100	DC20	DC25
Star Rating*	★★★/6.3	★★★★/7.3	★★★/5.8	★★/3.9	★★/4.6	★★/4.9
Price**	$299	$599	$399	$599	$199	$399
Phone number	201/440-0111	408/996-1010	201/361-5400	201/361-5400	716/724-4000	716/724-4000
Camera dimensions (w × h × d, in inches)	5.5 × 3.0 × 1.5	5.1 × 3.0 × 1.9	5.1 × 2.6 × 1.6	5.3 × 2.6 × 1.6	4.0 × 2.5 × 1.2	5.1 × 2.8 × 1.6
Weight (with batteries, in ounces)	13	12	7	9	4	10
Maximum image size (in pixels)	640 × 480	640 × 480	320 × 240	640 × 480	493 × 373	640 × 480
Built-in storage	2MB	none	2MB	4MB	1MB	2MB
Included removable storage	○	2MB	○	○	○	○
Removable storage support	○	●	○	○	○	●
Storage capacity (images at maximum size)	36	30	96	64	8	14
Closest focal distance (in inches)	24	3.5	4	4	24	24
Built-in flash	●	○	●	○	○	●
LCD preview and playback	○	●	●	●	○	●
Optical viewfinder	●	snap-on	○	○	●	●
Selectively erase images	●	●	●	●	●	●
Date-stamp photos	●	●	○	○	○	○
Photoshop acquire module	●	●	●	●	●	●
Save Photoshop image previews	●	●	○	○	●	●
Bundled software	Adobe PhotoDeluxe; Agfa PhotoWise	Adobe PageMill, PhotoDeluxe; Apple PhotoFlash, QuickTake 200 Camera Access utility; PictureWorks NetCard	Adobe PhotoDeluxe; Casio QV-PC utility	Adobe PhotoDeluxe; Casio QV-PC utility	Kodak PictureEasy; MetaCreations Kai's Power Goo; PhotoWorks PhotoEnhancer	Kodak PictureEasy; MetaCreations Kai's Power Goo; Photo-Works PhotoEnhancer

● = yes; ○ = no. * Based on features, implementation, innovation, performance, reliability, ease of use, and value. (see Star Ratings section for full explanation.) ** Actual prices could be higher or lower than the esti

The QuickTake 200's plastic viewfinder clips on top of the camera, unlike the built-in viewfinders on the DC25 and D-200L. It's not elegant but it's a feature that the otherwise similar DS-7 doesn't offer. Conversely, the PhotoPC 500 comes with a built-in viewfinder but supports an optional $199 attachable color LCD screen. It's great for viewing your shots on the spot, but the added appendage makes the camera awkward to carry.

Shoot and Wait

Shooting with a digital camera is simple. These are essentially fixed-focus, point-and-shoot cameras; your only choice is mode—normal or economy (the latter saves storage space). Press the shutter, the camera beeps, and the shot is recorded.

But try to take another shot right away and you're in for a disappointment. We had to wait from 2.2 to 5.4 seconds between shots while the camera stored the image. So if you're trying to capture a sequence of images, remember: with film, you can catch the action, but with a digital medium, you have to anticipate it.

The variation in delay times is due to three factors: image size, image resolution, and JPEG compression. The more information in the shot, the longer it takes to record. Also, some cameras compress images more than others to speed up frame capture and download rates. With severe compression, the unfortunate compromise is reduced image quality.

Point, Click, and Store

Another consideration when shopping for a digital camera is storage—how many pictures a filmless camera can hold before you must download them to your Mac. Unless you travel with a PowerBook, limited storage space will curtail how many pictures you can take.

Six cameras we tested use tiny removable memory cards that let you store pictures while you're on the road. The others have 1MB to 4MB of built-in storage, with capacity ranging from a low of 8 to a high of 96 best-quality images (see the table, "Snap Facts: Digital Cameras under $600 Compared").

The nice thing about the removable cards is that once a card fills up, you can swap in another and keep shooting. The downside is the cost for additional cards.

The QuickTake 200 and DS-7 come with a 2MB wafer-thin SmartMedia card that holds up to 22 maximum-quality shots. Additional cards cost $69. The Q-mini's 2MB CompactFlash card from Panasonic (additional cards cost $69) resembles a 1-by-2-by-0.25-inch PC Card. To replace it, pry open a panel, flip down a flimsy lever, and give it a firm push. If anything on this camera breaks, I'd bet it's here.

Swapping flash memory into the stocky Q-EZ is more elegant: you slide a knob to open a panel, press a release button, and swap in Konica's stamp-size card (additional cards cost $49). The DC25 is the simplest: you just slide in a Type 1 PC Card.

Epson	Fuji Photo Film	Konica	Konica	Olympus
PhotoPC 500	DS-7	Q-EZ	Q-mini	D-200L
★★★/6.1	★★★★/7.1	★★★/5.9	★★★/6.4	★★★/6.6
$499	$599	$399	$599	$599
310/782-0770	914/789-8100	201/568-3100	201/568-3100	516/844-5000
5.5 × 3.2 × 2.1 (8.5 wide with LCD)	5.1 × 3.0 × 1.9	6.1 × 3.3 × 2.8	3.5 × 3.5 × 2.0	5.7 × 2.8 × 1.8
14 (19 with LCD)	12	16	12	15
640 × 480	640 × 480	640 × 480	640 × 480	640 × 480
2MB	none	none	none	2MB
○	2MB	2MB	2MB	○
●	●	●	●	○
30	30	32	23	20
24 (8 with LCD)	3.5	1.4	1.4	8
●	○	○	●	●
optional***	●	○	●	●
●	○	●	○	●
○	●	○	●	●
●	●	●	●	●
○	○	●	●	●
○	○	●	●	●
Claris Home Page; Network Sound & Light Postcards from the Net; Storm Easy Photo	Adobe PhotoDeluxe; Fujifilm SD-T7/M Data Transfer Software	Adobe PhotoDeluxe; Konica Q-EZ utility	Adobe PhotoDeluxe; Konica Q-mini utility	Adobe Acrobat, PhotoDeluxe; Olympus D-200L utility

street price provided by the company. *** *Additonal $199 for LCD.*

From the Camera to the Mac

Eventually you must download your images from the camera's storage to your hard drive. All the cameras we tested connect to the Mac via the serial port and use a software utility that allows you to see thumbnails of the shots. Click on a thumbnail, and the camera downloads it to your hard drive.

Although installing each camera's software went smoothly, they had some irksome quirks. For example, Agfa's PhotoWise software was supposed to download images to a folder I chose, but it only saved shots to a default folder.

The software for the Casio cameras, the D-200L, and the Q-mini all force you to name and save images one at a time, rather than downloading the whole batch and automatically assigning numbers to each file. Fuji's software shows gray boxes instead of thumbnails. To see a thumbnail, you have to guess which gray box it is.

The QuickTake 200 supports QuickTime IC (Image Capture), so you can drag and drop thumbnail images from the software straight into programs such as the bundled Adobe PageMill.

Faster Downloads

Each camera has a fixed resolution—640 by 480 pixels—except the DC20 with 493 by 373 and the QV-10A with 320 by 240. The higher the resolution, the more information the camera captures. When you use a camera's economy mode so that you can take more pictures, the camera crops the photo or compresses the data more. Either way, the camera stores less information, which means lower-quality output but faster download speeds. Ideally, a camera downloads photos quickly but degrades quality minimally.

Transferring data at 12.12 Kbps, the D-200L moves more data to your Mac per second than any of the other cameras, yet produces crisp, clean pictures. Neck and neck for speed with the D-200L is Konica's Q-mini, at 11.84 Kbps, but its lower resolution and heavy-handed JPEG compression yield blurred and noticeably pixelated shots. (Oddly, Konica's Q-EZ poked along at 4.75 Kbps, the slowest we tested.)

The DS-7 and the Apple QuickTake 200, both manufactured by Fuji, are identical in construction and components except for one thing: the way the two cameras implement economy mode. Normal mode for both is 640 by 480 pixels. To save storage space and accelerate downloading in economy mode, the DS-7 crops the image down to 320 by 240 pixels (this smaller area is outlined by a white rectangle visible on the LCD), while the QuickTake 200 compresses the heck out of the 640-by-480-pixel shot using JPEG. Since smaller images contain less information, they download faster, but I favor Apple's decision to opt for a bigger picture, even though the compression leaves behind some pixel artifacts.

Picture Imperfect

Regardless of the compression scheme, image quality actually starts with the lens's precision and the camera's exposure accuracy.

No digital camera produced perfect shots—hues shifted and pixels marred oblique lines. For example, test images from the Casio cameras were beyond image-editing repair, due to missing colors and serious pixel noise in detail areas. The sharpest shots came from the D-200L, ePhoto 307, and PhotoPC 500, while the QuickTake 200 and DS-7 delivered superior color accuracy (see the sidebar "Digital Proof Sheet").

Software for Image Artistry

Each camera bundles a basic image-editing application so you can apply sharpening filters (which they always need), adjust color balance, crop out unwanted details, or go wild distorting shots with a small arsenal of special effects.

Eight of the cameras come with Adobe PhotoDeluxe. Designed for the nonprofessional graphics user, it helps you with corrections and walks you through fun imaging projects such as inserting backgrounds and turning your kid's mug into funny money.

Weather, Warranties, and Power

Fun is fun, but what about the tire-kicking issues—reliability, durability, and power consumption?

All-weather film cameras are as ugly

Macworld LAB TEST

Digital Images: How Many, How Fast, How Good

When you're shopping for a digital camera, image quality is a key consideration. In this category, the Olympus D-200L was a clear-cut winner with our panel of experts. In addition to how many images a camera will hold, you'll want to take into account how long it takes to shoot, preview, and download the images. To get an idea of how long it takes a camera to transfer images to your Mac, look at the download rate, which shows the speed at which data is transferred. Remember that cameras that hold more images will take more time to download. For example, the Casio QV-100 and the Apple QuickTake 200 have similar transfer rates, but the QV-100 holds over twice as much image data and thus takes roughly twice as much time to download when it's filled to capacity.

Best overall performance. Lower scores are better for results in seconds. Higher scores are better for download rate and image quality.

	SPEED				QUALITY	
	Storage Capacity/ Number of Pictures*	Download Rate	Download Time (in seconds)	Thumbnail Preview (in seconds)	Time between Pictures (in seconds)	Exposure	Image Quality Score
Agfa ePhoto 307	2MB/36	9.35 Kbps	219	29	4.1	Manual flash (fill)	3.7
Apple QuickTake 200	2MB/30	7.59 Kbps	270	32	4.5	Small aperture	3.0
Casio QV-10A	2MB/96	5.74 Kbps	357	125	3.8	Small aperture	1.3
Casio QV-100	4MB/64	7.45 Kbps	550	206	4.9	Small aperture	2.3
Eastman Kodak DC20	1MB/8	6.13 Kbps	167	13	3.4	**	2.0
Eastman Kodak DC25	2MB/14	6.17 Kbps	332	49	2.2	Manual flash (off)	2.0
Epson PhotoPC 500	2MB/30	9.94 Kbps	206	21	4.2	Manual flash (fill)	3.3
Fuji Photo Film DS-7	2MB/30	8.53 Kbps	240	***	4.8	Small aperture	3.3
Konica Q-EZ	2MB/32	4.75 Kbps	431	35	5.4	Auto flash (off)	2.7
Konica Q-mini	2MB/23	11.84 Kbps	173	9	4.8	Auto flash (off)	3.3
Olympus D-200L	2MB/20	12.12 Kbps	169	15	4.4	Auto flash (off)	4.5

*Maximum resolution. **No exposure options available. ***No thumbnail preview.

Behind Our Tests

Macworld Lab tested the speed of each camera by measuring how long it took to download and preview images with the camera's storage filled to capacity; we used the download utilities that shipped with each camera. Memory allocation was set to 30MB to minimize disk access. We also timed how long it took before each camera was ready to take another picture, using the highest resolution setting with the flash disabled. All tests were performed on a Power Macintosh 7500/100 running System 7.5.5, with 64MB of RAM, a 256K cache, a 17-inch monitor set to millions of colors (at 832-by-624 pixel resolution), a disk cache set to 1024K, virtual memory and RAM disk disabled, and AppleTalk enabled.

A panel of *Macworld* staff rated the color fidelity and detail of a still-life image captured by the cameras on a scale of 1 to 5 (with 1 unacceptable and 5 excellent). The panel looked at two different exposure types for each camera: for cameras with a flash, one without a flash and one with a fill flash; for cameras without a flash, one with a large aperture setting and one with a small aperture setting. The benchmark includes the higher score of the two images.—**Macworld Lab testing supervised by Jeff Sacilotto**

as sin, but sometimes it makes sense to sacrifice looks for practicality. Drop one of these digital beauties while snowboarding and your photography will come to a halt, but even rain gave me a close call with the Q-mini. The camera is fairly rugged, but when I opened a flash-memory panel on a wet day, I could see part of the circuit board inside. One chance raindrop and this device could have been toast.

Remember that each of these cameras is covered by a brief, one-year warranty. Only Kodak's DC25 offers an optional three-year replacement plan for $40 more.

While digital cameras save on film, they gobble batteries—particularly models with those power-guzzling LCD screens we like so much. You can expect to feed three to four fresh AA lithium ion or alkaline batteries during every other outing. Only the DC20 stayed charged for nearly eight hours on a diet of just one 3-volt LiIon battery. I squeezed two hours out of each Casio, while the other cameras worked for almost three hours.

Only the QuickTake 200, DS-7, and Q-mini include an AC adapter; with the others, this option costs $19 to $49. If you plan to use the camera frequently, invest in an adapter and rechargeable batteries.

Macworld's Buying Advice

Ironically, the camera I liked best for image quality, the $599 Olympus D-200L, is being discontinued as I write. Olympus informs us a $499 camera, the D-220L, that we'll like even better is replacing it. (Stay tuned to *Macworld* for a review when the D-220L hits the streets.)

In the meantime, the $599 Apple QuickTake 200 ran a close second to the Olympus in image quality and bests it for features such as a close-up lens and removable storage. The QuickTake 200 noses past the look-alike Fuji DS-7—also an excellent camera—thanks to a more logical image-compression scheme and streamlined downloads.

For a no-frills camera that produces surprisingly crisp shots, Agfa's $299 ePhoto 307 is your best bet.

Given the stream of new models, enticing features, and competitive pricing, now is a great time to shop for a digital camera. **m**

JOHN GODDARD is a freelance writer, photographer, and former *PC World* editor now living in Prague.

EDITORS' CHOICE

The digital-camera market is changing too rapidly for us to pick an Editors' Choice. The best camera we tested, the Olympus D-200L, is being replaced by the D-220L.

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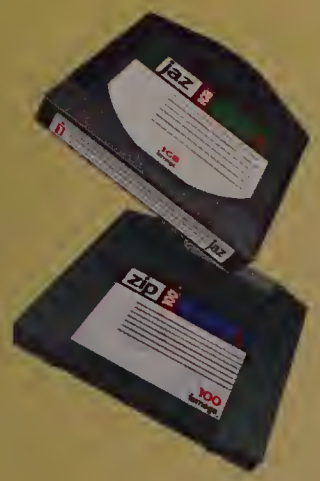
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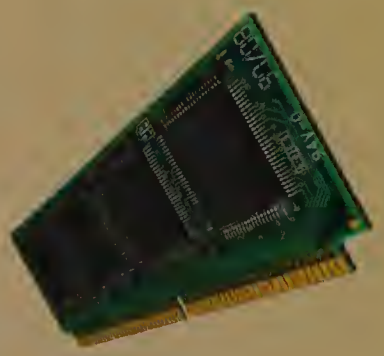
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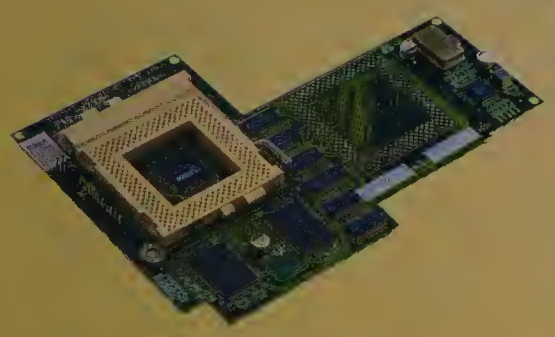


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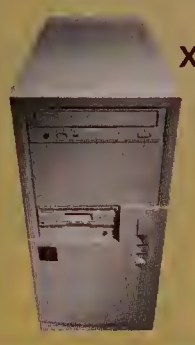




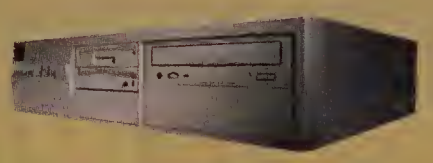
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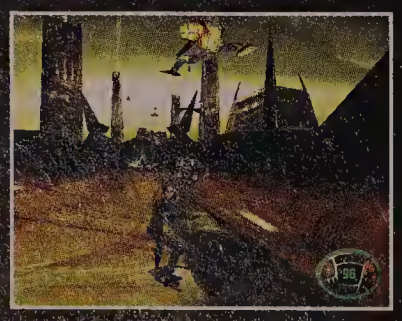
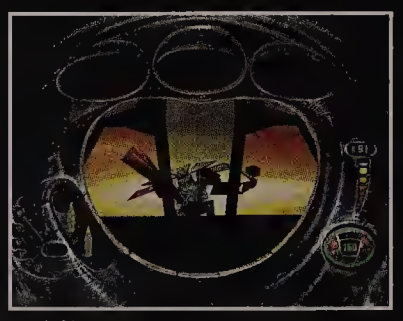
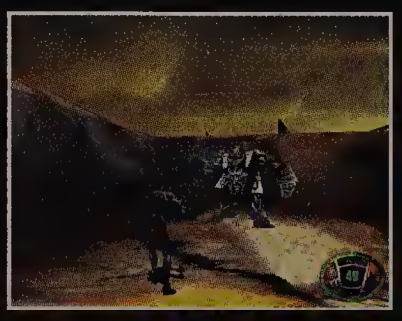
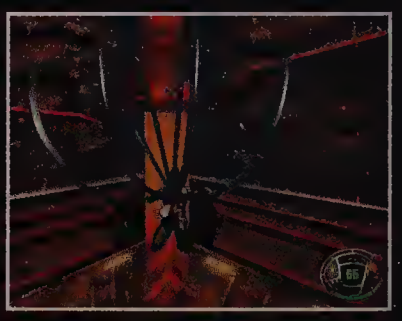


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SCAN IT

9 scanners under $600 generate crisp images

by Peter M Stoller

SAY YOU'VE GOT A KILLER PRODUCT you want to pitch on your Web site. Or you have several new faces to introduce in your company newsletter. Or you're writing a term paper on Italian Renaissance paintings. You know a picture is worth at least a thousand words, but how in the world do you get that picture into your desktop publishing project?

For most people, the answer is a flatbed color scanner. These desktop devices can bring photos, illustrations, and even text right into your Macintosh. They don't provide the mobility of a digital camera (for more on those, turn to the feature "Snap It," in this issue). But they're versatile, and with hot new Macs bringing image-editing muscle down to earth, and the latest ink-jet printers finally making the dream of cheap, high-quality color printing a reality (for more information see the feature "Print It," also in this issue), it's easy to understand the rising demand for good low-cost scanners. Competing to take advantage of the rising demand, vendors are beefing up the hardware specs on their entry-level models from 300-dots-per-inch to 600-dpi resolution and from 24-bit to 30-bit color while dropping their prices—for some, to under $300.

When it comes to performance and value, hardware specs and price tags alone do not tell the whole story. So Macworld Lab rounded up nine scanners that sell for under $600 on the street, put them on the test bench, and checked them all for speed. We also laid our test scans in front of *Macworld*'s panel of graphics experts, who compared them for sharpness and color fidelity. Finally, we evaluated the devices' scanning utilities and other bundled software to see which scanner really gives you the most for your money.

We didn't find any giant-slayers among these cut-rate contenders; if you're producing images for high-end publishing, you won't find the level of features and image quality you need here. For Web and mainstream desktop publishing, though, we found some solid performers, and—surprise!—the best of them have neither the most impressive advertised specs nor the biggest price tags.

Details, Details

Whether high end or low, all scanners work essentially the same way. The scanner has a transparent surface on which you mount your document. A light source illuminates the document, so the scanner's *optics*—its network of lenses and mirrors—can "see" it. A transport mechanism moves the optics and light assembly over the document, projecting the image line by line onto the optical sensors, which then turn the image into a sequence of tiny colored dots that you view and edit on screen. What distinguishes an excellent scanner from a poor one are primarily the overall engineering and the quality of the components.

The ability of a scanner to resolve fine details rests in part on how many dots per inch its sensors can capture—its *optical resolution.* The scanners in our survey have optical resolutions of either 300 or 600 dpi. Nowadays that's far from state of the art, but it's plenty for many tasks. Don't be fooled by impressive-sounding specs for *interpolated* resolution. Interpolation is an after-the-fact, "fill-in-the-blanks" software function that's of little practical value.

Get the Picture?

Perform the same scanning operation on ten different scanners, and what do you get? Ten different results. Using either default or automatic settings—whichever produced better results—we scanned both our test image and an industry standard IT8 color-calibration swatch on each of the scanners under scrutiny. Then we asked our service bureau to use a state-of-the-art drum scanner to do the same, and prepare a Matchprint as a reference (top row, far left). By comparing our scans with the Matchprint, you can see how much these scanners deviate from the ideals of color and detail resolution.

Of course, none of these scans is perfect. But the closer an image is to perfect, the more likely it is that some judicious editing will make it right. Remember, you can't fix what isn't there, so while you might be able to correct the heavy color cast that the Microtek ScanMaker V300 imposed, you can never get back the highlights that ScanMaker E6 didn't capture.

Software tools also make a difference; while the Hewlett-Packard HP ScanJet 5p scan has color roughly comparable to that of the Umax Astra 600S, HP PictureScan's color-correction tools can't touch Umax VistaScan's.





Professional Drum Scan A skilled technician operating equipment that retails for $100,000 or more can achieve scans you couldn't hope to duplicate on even the best sub-$600 unit. The colors are true to the original and the details razor-sharp.



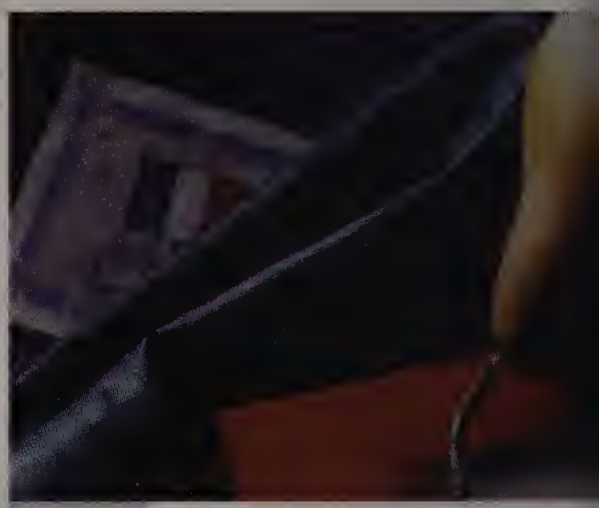


Agfa SnapScan With Agfa's great soft ware, the SnapScan snaps a sharp pic ture—look at the watermarked bil However, it's a dark one, and note th brown tone of the pear and pictur frame.





Microtek ScanMaker E6 With colors close to the Apple Color OneScanner's, if a bit washed-out, and merely average detail resolution, the ScanMaker E6 relies on Microtek's clever ScanWizard software to elevate it to contender status.





Microtek ScanMaker V300 The bar gain-priced ScanMaker V300 come with great software and captures sur prisingly good detail. Too bad the colo is marred by a heavy blue cast.

So, more optical resolution is better, right? Not necessarily. Your final image resolution is limited to what your output device can handle. For on-screen display at 72 dpi, as on a Web page, or for printing halftones to a 600-dpi monochrome printer, as in a typical newsletter, a scanning resolution over 300 dpi gets you nothing but bigger files and slower printing and image-editing performance. Higher optical resolution is important when you need to enlarge small originals, scan line art, or print to high-resolution output devices. If you don't need those capabilities, don't pay extra for them.

There's another reason higher optical resolution doesn't guarantee greater detail. Just as you won't get a sharp photo from a camera with high-grade film and a blurry lens, so you won't get fine detail from a scanner with high resolution and fuzzy optics. Inexpensive optics (and transport mechanisms) keep costs down but can also limit image quality.

So, which of these scanners can really sweat the details? Compare the output samples, especially the watermark on the note, texture of the fabric, ridges on the pear's stem, and grain of the wooden frame. We did, and we found that, aside from Umax's (*www.umax.com*) 600-dpi Astra 1200S, the best detail in the scans came from the Agfa (*www.agfahome.com*) SnapScan and the Microtek (*www.microtekusa.com*) ScanMaker V300—both 300-dpi scanners.

Color Counts

In an effort to yield more-accurate color, manufacturers are making scanners that capture more colors. A 24-bit scanner captures 8 bits (256 levels) each of red, green, and blue—a total of 16.7 million colors; a 30-bit scanner, with 10 bits (1024 levels) per primary color, captures over a billion colors.

But your Mac can't display more than 16.7 million colors, and few 30-bit scanners produce final scans with more than 24 bits. Besides, 24-bit color is considered photo-realistic. So what's the point of providing the extra bits? Simple: the last couple of bits per color tend to be inaccurate. If you increase the total number of bits in the scanner, the scanner software can toss out the extra bits and deliver a more accurate 24 bits.

Simple in theory, that is. In our tests of the 30-bit scanners, the Pacific Image Electronics (*www.scanace.com*) ScanAce II's colors were washed-out, the Microtek ScanMaker E6 had trouble with highlights, and the Umax Astra 1200S had a





Apple Color OneScanner 600/27 The user-friendly OneScanner's dark colors are a hair better than the Umax Astra 600S's, but otherwise the Apple scanner gets nearly identical results for more than twice the price.





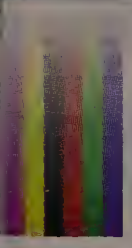
Hewlett-Packard HP ScanJet 5p The ScanJet 5p's saturated colors are appealingly eye-grabbing but not accurate. HP's feature-starved software is a big minus for anyone who wants to go past one-button scanning.





La Cie Silverscanner Pro The Silverscanner Pro yields dimmer, greener colors than the others—note the yellows and highlights on the color target—and less detail. Maybe La Cie's new software will help; the software we tested didn't.





Pacific Image Electronics ScanAce II The ScanAce II's washed-out, fuzzy scans and slow performance prove that 30-bit color and 600-dpi resolution specs don't guarantee quality.





Umax Astra 600S On balance, this is the best deal in the bunch. Its slightly blue scans fall just shy of the Color OneScanner's and ScanMaker E6's, yet the 600S costs about half as much as those machines. Plus, it has great software.





Umax Astra 1200S The Astra 1200S captured the best detail and most accurate color target, yet it reproduced the dark green fabric as midnight blue. Not bad, but not worth twice as much as the Astra 600S.

tendency to go blue. Meanwhile, the 24-bit Hewlett-Packard (*www.hp.com/go/scanjet/*) HP ScanJet 5p and 27-bit Apple (*www.imaging.apple.com*) Color OneScanner 600/27 gave the 30-bit scanners a real run for their money. The distinction lies in how each scanner's color tables translate what its optics see to the digital image you see on screen. Without fairly accurate tables, more bits just get you more wrong colors.

While sharpness and color accuracy are the most important areas of scanner performance, speed also counts. Slow scans and previews hold up production. Fast previews are particularly critical because most of your interaction with the scanner—cropping, sharpening, basic color correction—is in the preview process.

The Agfa SnapScan gets you to work on prescan editing fastest of all—more than three times faster than the sluggish ScanAce II. The Color OneScanner 600/27 and Astra 1200S make good time in previews, too, as well as being the standouts in final color scanning time. (See the benchmark, "Color Scanners: Chomping at the Bits.") The value of quick previews, though, depends largely on what you do with those previews once you've got them.

Scanning Software and Options

Great hardware won't do you much good without software that lets you quickly and easily extract the best results your scanner can deliver. These scanners all include software that lets you bring images directly into image-editing programs such as Adobe Photoshop. Finding and using the tools for such routine but critical functions as selecting the scan area, setting the scanning resolution, adjusting tonal range, and applying sharpening should be intuitive. Unfortunately, that's not always the case.

Good scanning plug-ins, such as Agfa's FotoLook, Microtek's ScanWizard, and Umax's VistaScan, achieve an effective balance of power and usability so that you can fine-tune your scans without constantly thumbing the manual for direction. Their many image-control options are easy to access and use, with clear visual feedback so you know what you'll get before you scan.

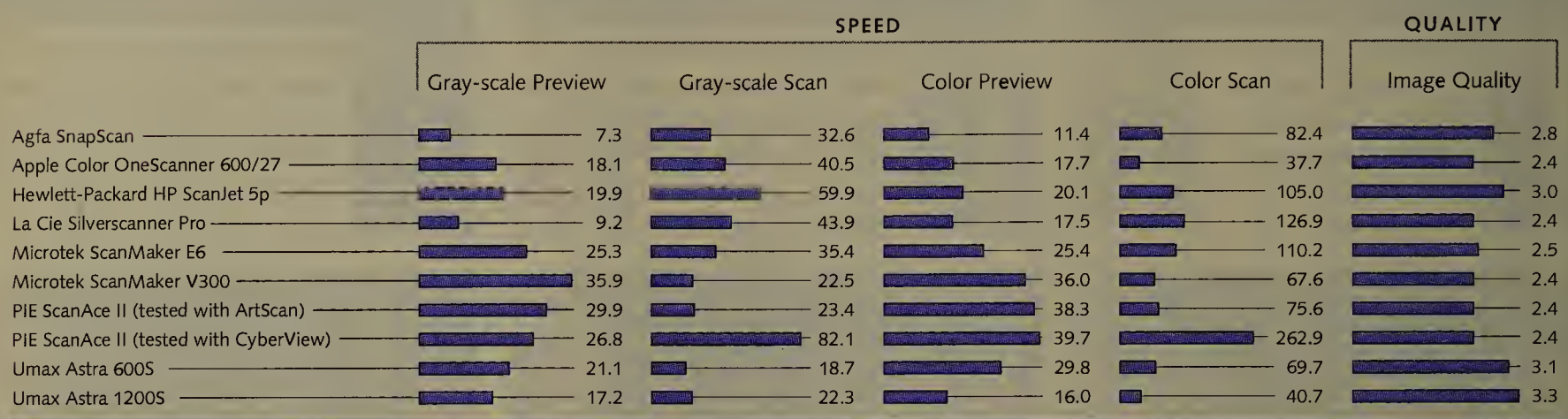
VistaScan has the clearest interface, simple enough for a beginner to use without compromising on vital features. The highlight is its full, flexible automation for streamlined scanning that doesn't stint on quality.

Macworld LAB TEST

Color Scanners: Chomping at the Bits

The most important consideration in choosing a scanner is not speed, but image quality. Here, our panel gave the win to the two Umax scanners, with the Hewlett-Packard ScanJet 5p and Agfa SnapScan nabbing place and show. Speed has no bearing on the quality of your scans, but it can make a big difference in the quality of your scanning experience. These numbers show which scanners will have you tearing through work, and which tearing out your hair. The SnapScan lived up to its name on previews, while Apple's Color OneScanner 600/27 is the color scanning speed champ by a wide margin. The two sets of results for the PIE ScanAce II show that scanning software can determine speed: while JetSoft's ArtScan performs respectably on final scans, PIE's own CyberView could have you wondering if the scanner is plugged in.

Speed results are in seconds; shorter bars are better. Image quality is based on a 5-point scale; longer bars are better.



Behind Our Tests

To test a scanner's speed, Macworld Lab measured the prescan time (in color and gray scale) and the final scan time for two 8.5-by-10-inch images, one color and one gray scale, at 300 dpi. All scanners were tested using their default settings. We allocated 30MB of RAM to Adobe Photoshop when a scanner plug-in was involved, or 30MB to the scanner applications themselves, so that disk access (performance of the hard drive) is not factored into the timings. All tests were performed on a Macintosh 7500/100 (System 7.5.5) with 64MB of RAM, a 256K L2 cache, a 17-inch Apple Multisync monitor set to millions of colors, 832 by 624, disk cache set to 1024K, virtual memory and RAM disk disabled, and AppleTalk enabled.

To judge image quality, a panel subjectively evaluated scans from each product produced at its default settings. We rated each scanner for color fidelity, sharpness of detail, accurate gray reproduction, and highlight and shadow detail.—**Macworld Lab testing supervised by Jeff Sacilotto**

Low-Cost Scanners: The Good News Is Good Deals

Company	Product	Star Rating*	Price (list/ company's estimated)	Phone Number	Maximum Scanning Area (in inches)	Optical Resolution (in dpi)	Maximum Color Depth	Automatic Document-Feeder Option
Agfa	SnapScan	★★★/6.9	$299/$299	508/658-5600	8.5 × 11.7	300	24-bit	$250 (60 pages)
Apple Computer	Color OneScanner 600/27	★★★/6.3	$629/$549	408/996-1010	8.5 × 11.5 (8.5 × 14 with document feeder)	300	27-bit	$359 (20 pages)
Hewlett-Packard	HP ScanJet 5p	★★/5.2	530/$449	415/857-1501	8.5 × 11.7	300	24-bit	NA
La Cie	Silverscanner Pro	★★/4.1	NA/$349	503/844-4500	8.5 × 11.67	300	24-bit	NA
Microtek	ScanMaker E6	★★★/5.6	NA/$299	310/297-5000	8.5 × 13	600	30-bit	$400 (10 pages)
	ScanMaker V300	★★★★/6.7	NA/$149	310/297-5000	8.5 × 11.7	300	24-bit	NA
Pacific Image Electronics	ScanAce II	★★/3.5	$399/$399	310/214-5281	8.5 × 14	600	30-bit	$329 (50 pages)
Umax	EDITORS' CHOICE Astra 600S	★★★★/7.8	$299/$249	510/651-4000	8.5 × 14	300	30-bit	NA
	Astra 1200S	★★★★/7.0	$549/$449	510/651-4000	8.5 × 14	600	30-bit	NA

*NA = not available. * Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.)*

FotoLook has the widest range of features for the advanced user, such as an XTension for scanning directly into QuarkXPress. It's a bit deep for beginners, though, so Agfa also includes FotoSnap, a vastly simplified (but still functional) plug-in.

ScanWizard looks cluttered at first, but once you adjust to it, you'll find its tool set well stocked and sensibly organized. If only you could switch between ScanWizard and Photoshop after scanning. Unfortunately, ScanWizard's dialog box is in a fixed position in front of the image, so you have to quit it to see the results, when you may want to make minor adjustments and rescan.

Apple's OneScanner Dispatcher is effectively geared toward the novice, but the lack of such features as prescan sharpening and gamma control limit its usefulness for more advanced users. Hewlett-Packard's PictureScan has virtually no image-control options beyond specifying one of four original document types: Pictures, OCR/Text, Fax, and Other.

La Cie's (*www.lacie.com*) Silverscan plug-in has inadequate sharpening and black- and white-point controls, and has an interface too confusing for even an experienced user to navigate. (At press time, La Cie was readying new software, which should be shipping by the time you read this.) Finally, Pacific Image Electronics (PIE) offers two options—PIE CyberView and JetSoft ArtScan—both with highly uneven interfaces and weak feature sets.

All the scanners include optical character recognition (OCR) for converting scanned characters to editable text, and an entry-level image-editing program. Microtek, PIE, and Umax bundle the full version of Photoshop for about $150 to $200 extra; La Cie offers Photoshop LE for $100. If you intend to do extensive OCR work, consider a scanner with an optional automatic document feeder for scanning multiple pages. But if you're tempted by the optional transparency adapters several vendors offer, remember that transparency scans typically require substantial enlargement, so even a 600-dpi scanner is barely adequate (see the table, "Low-Cost Scanners: The Good News Is Good Deals").

Macworld's Buying Advice

It's hard to beat the Umax Astra 600S for its good balance of color accuracy, preview speed, strong software, and value. Close behind are the Microtek ScanMaker V300 and Agfa SnapScan, which haven't the Astra 600S's color accuracy but beat it on sharpness and, like the Astra 600S, have good software. All three have irresistibly low prices—the lowest in our survey. The highest quality for the lowest cost? Now that's a picture we really like. **m**

PETER M STOLLER (*afcpeters@aol.com*) is a consultant to America Online's Mac OS Resource Center.

EDITORS' CHOICE

★★★★/7.8 **Umax Astra 600S** With its good color fidelity and software usability on the one hand, and its low image noise and price on the other, the Astra 600S is our top choice for a low-cost scanner. **Company:** Umax Technologies (510/651-4000, *www.umax.com*). **Company's estimated price:** $249.

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Umax Parrots Reality



Umax Vista S-E6



Umax Astra 600S

When *Macworld* evaluated scanners earlier this year ("Scanning for the Rest of Us," *Macworld*, March 1997), the Editors' Choice award went to the Umax Vista S-6E (left), a nifty little performer that retailed for an affordable $345. Shortly thereafter, Umax replaced the Vista S-6E with the Astra 600S, list priced at $299, and we were besieged by readers wanting to know whether the new product was really an improvement on the old. Sure enough, our test scan from the Astra 600S was slightly but noticeably brighter and sharper than that from the Vista S-6E.

Transparency Adapter Option	Included Software
$200 (8 × 10 in.)	Agfa FotoLook, FotoSnap, and FotoFlavor; Caere OmniPage LE; MicroFrontier Color It; ULead SoftCopy
NA	Acquire Scan Module (Adobe Photoshop plug-in); Apple OneScanner Dispatcher; Xerox TextBridge PageManager LE; Postcards for the Net
NA	Adobe Photoshop LE; Caere OmniPage Lite OCR; HP PictureScan, ScanJet Copy, Scanner Calibration and Utilities; Visioneer PaperPort
NA	Adobe Photoshop LE (prepress only); La Cie Silverscan plug-in, driver, and control panel; Xerox TextBridge
$299	Adobe Photoshop or MicroFrontier Color It; Caere OmniPage LE or Xerox TextBridge Pro; Microtek ScanWizard
NA	Caere OmniPage LE; MicroFrontier Color It; Microtek ScanWizard; Visioneer PaperPort
$379 (8.5 × 13 In.)	Adobe Photoshop; JetSoft ArtScan; MicroFrontier Color It; PIE CyberView; TextBridge Classic
NA	Adobe PhotoDeluxe; NewSoft Presto PageManager; Umax VistaScan
$249 (8.5 × 11 in.)	Adobe PhotoDeluxe or Photoshop; NewSoft Presto PageManager; Umax VistaScan

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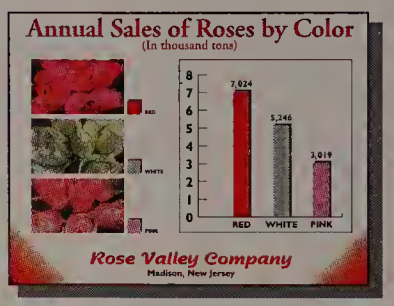
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1. Continuous recording (10-second intervals with flash off) 2. Some systems may require supplied ArcSoft™ software

SONY

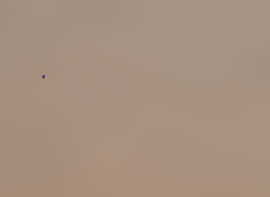
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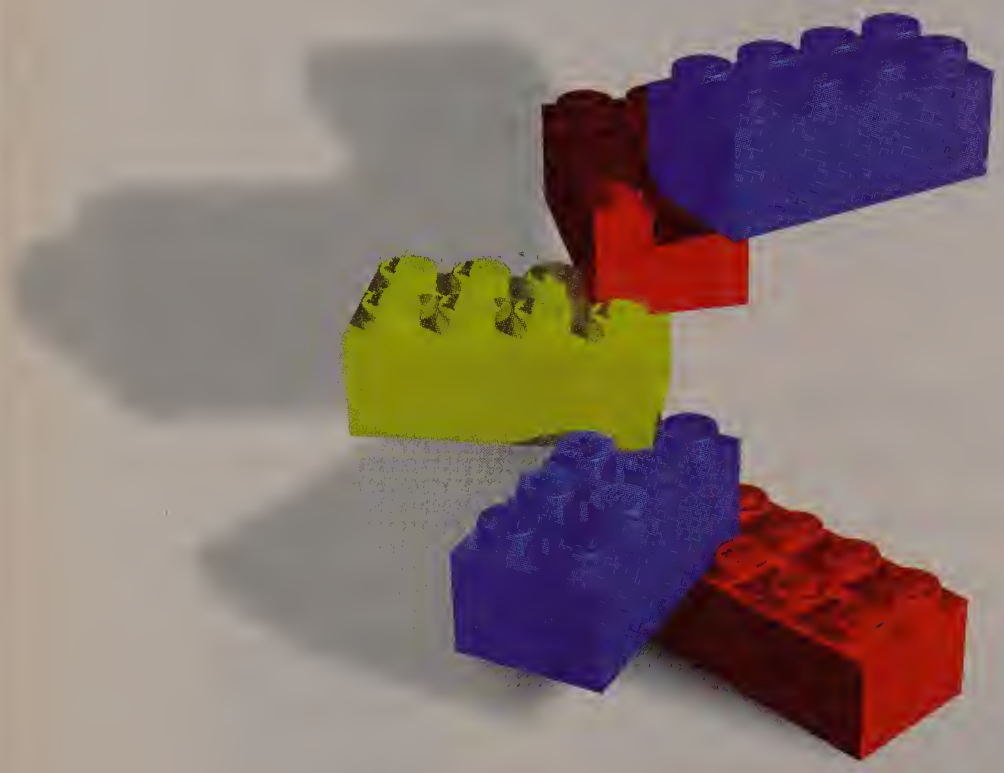
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Top low-cost image editors sharpen your best shots

by Jim Heid

TWEAK IT

FOR SHUTTERBUGS WHO OWN Macintoshes, this is a wonderful time to be alive. The Mac has been a digital-imaging demon for years, but the key hardware—scanners, digital cameras, color printers—has been geared toward publishing professionals and priced accordingly. Today, you can buy a scanner, digital camera, *and* color printer for less than $1000 (see the features "Scan It," "Snap It," and "Print It," in this issue).

But hardware is only half the picture. No matter how great the image, there's always room for improvement—flaws to fix, colors to correct. To manipulate your images—resize and retouch, crop and color-correct—you need the right software tools. Most professionals turn to Adobe Photoshop for its unmatched editing features and support for four-color printing, but for the price, you could buy a scanner *and* a digital camera. Plus, it demands a fast Mac with plenty of memory and hard-disk space, and its learning curve is as steep as a San Francisco street. Besides, for routinely cleaning up scans and digital snapshots, Photoshop's industrial-strength capabilities are overkill.

Bantamweight Bargains

Fortunately, the mushrooming popularity of low-cost digital cameras and scanners has led to a corresponding boom in inexpensive imaging software. If you simply want to do some retouching, you may already have everything you need: many scanners and digital cameras include entry-level imaging software, most often Adobe PhotoDeluxe or Photoshop LE (for *limited edition*).

In addition to these standbys, numerous programs provide solid editing features but won't tax your budget, your Mac, or your brain. Some of these VolksPhotoshops even perform tricks that Photoshop can't, such as creating calendars and automatically fixing scratches. So here's a guide to stocking an economical imaging toolbox, along with a set of cheat sheets for the most common scanning and image-manipulation tasks. Even if you're an imaging professional, you might find a useful addition to your toolbox here.

I tested six imaging programs ranging from $19.95 to $149.95 (see the table "Imaging Software That Does More for Less"). The selection breaks down into these broad categories.

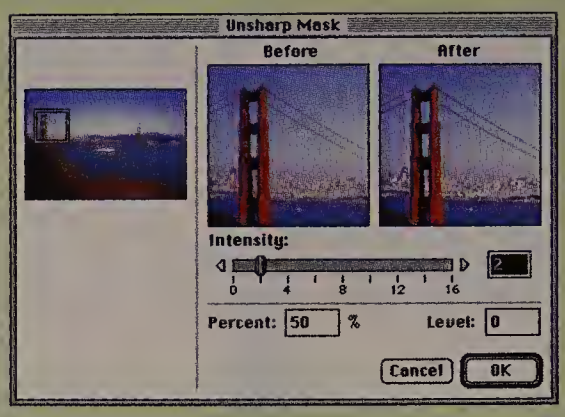
Programs That Wanna Hold Your Hand

A rogues' gallery of common flaws plagues digital photos, ranging from inaccurate color balance to scratches and dust. If you want software that fixes those for you, look at Adobe's (*www.adobe.com*) $49 PhotoDeluxe 1.1, MetaCreations' (*www.metacreations.com*) $49.95 Kai's Photo Soap 1.0, and PictureWorks' (*www.pictureworks.com*) $129.95 HotShots 1.0. All three automatically correct flaws such as inaccurate color balance. All three also enable you to add special elements such as simulated frames, clip-art cartoons, and calendars to images.

PhotoDeluxe operates in two modes: Guided Activities and On Your Own. In Guided Activities mode, tabbed windows walk you through image-repair jobs and design projects ranging from calendars to head replacement (always a favorite), in which the program helps you perform digital noggin surgery. On Your Own mode is aptly named: it provides a solid subset of Photoshop's features, but when you use them you're truly on your

BEFORE you even switch on your scanner, make sure its glass scan bed is spotless. You'll get a sharper scan with fewer flaws to correct if you first wipe down the scanner with glass cleaner and a soft, lint-free cloth or paper towels. Be sure the glass is completely dry before positioning your photo.

The first, and one of the most important, decisions you face when scanning involves choosing the appropriate resolution. The scan's number of dots per inch (dpi) will affect the image's file size and can have an impact on the quality of the final product. See the table "What Resolution Should You Use?" for some expert guidelines on scanning images for various types of output. (In fact, why not cut it out right now and post it somewhere near your scanner for easy reference?)



Fixing a Fuzzy Photo

To sharpen a fuzzy image, apply a sharpening filter immediately after the scan. Strangely, the best filter to use for this task is called Unsharp Masking, which most imaging programs provide. Experiment with its controls to find the best settings for the image. You've gone overboard if you see odd artifacts such as halos around the image's sharp areas. If that happens, choose Undo and try a lower value.

Inexpensive scanners sometimes yield fuzzy and speckled images, almost as though someone had smeared petroleum jelly on the lens. Unsharp Masking can help, but it's not a cure-all. Your best bet is to buy a better scanner.

own—few are even mentioned in PhotoDeluxe's colorful but slim manual.

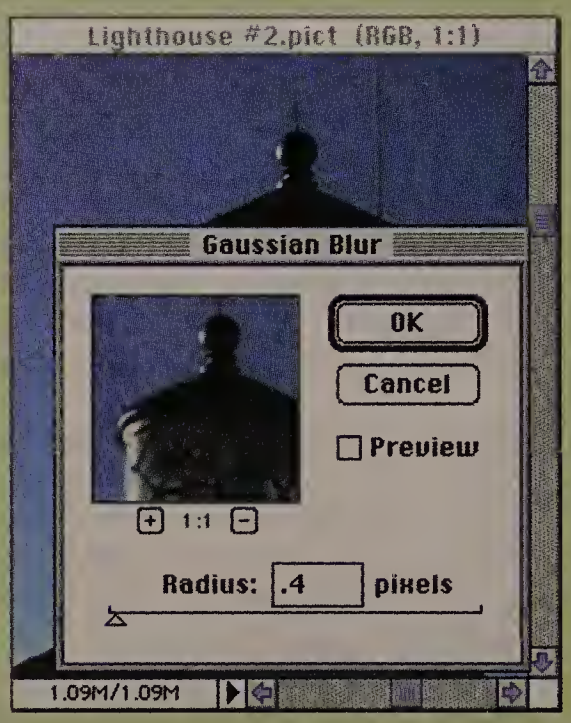
Kai's Photo Soap is the kind of something-completely-different program for which MetaCreations is known. Forget standard tool palettes and dialog boxes—Soap's interface uses beautifully designed, photo-realistic tools and futuristic controls. But mastering this exotic interface is difficult and often frustrating, and Soap's manual is lean on details.

Soap has flashes of brilliance. You can selectively erase changes to an image, for instance, and when you zoom in for fine detail work, the program inserts additional pixels to make the image easy to work with. But there are also lapses. Most notably, when you choose Quit, the program doesn't ask if you want to save changes. And Soap is not for lightweight Macs. It demands at least 12MB of free memory, and prefers 20MB. Even using a 200MHz 603e-based system, I found Soap's performance to be only acceptable. In contrast, both PhotoDeluxe and HotShots run on 680X0 Macs.

HotShots strikes a happy balance between hand-holding and power. Its SmartPix mode automatically enhances an image. First you specify what kind of device captured the image. (SmartPix supports dozens of digital cameras and scanners, and a plug-in system lets you add profiles as they become available.) Next, check a few boxes to describe the conditions under which the image was taken—indoors or outdoors, with or without flash, and so on. HotShots then adjusts the image's color balance and

Remove That Red-Eye

Red-eye occurs when light from a camera's flash reflects off the retinas of the subject's eyes, creating an unnerving reddish glow. One way to remove red-eye is to paint over it with an imaging program's paintbrush. (Zooming in first will make it much easier to see what you're doing.) Another way is to select the red areas using the program's magic-wand selection tool, and then change the color. Adobe PhotoDeluxe's Guided Activities mode has a red-eye–removal feature that uses this second technique.



Gaussian Blur in Photoshop LE

Photo Soap and HotShots have terrific red-eye–removal tools—just paint across the red spots. Soap's tool even lets you colorize the eyes, changing them to brown, blue, or hazel.

Correct Color Balance

Photos taken under poor lighting conditions or under fluorescent lights may have an unpleasant color cast. HotShots has the best color-correction feature; Photo Soap does a good job, too.

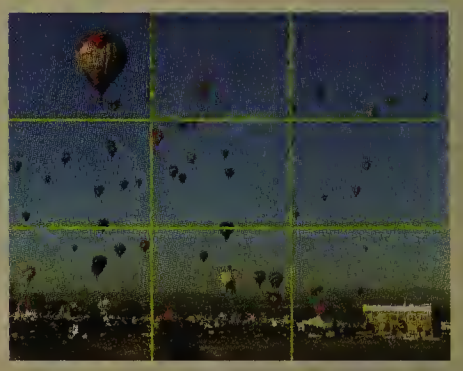
Minimizing Artifacts

Images captured with digital cameras often contain compression artifacts where sharp edges meet (for example, a tree against a blue sky). You can minimize these artifacts by applying a slight blur to the image. The Gaussian Blur filter in Photoshop LE (and, of course, the full Photoshop version) does a particularly nice job; try blur values of 0.4 or 0.5. Your goal is to minimize the artifacts without making the image look out of focus.

Cropping

Improve the composition of an image by cropping out detritus that detracts from the primary subject.

Cropping techniques vary from program to program. In Photoshop LE, select the cropping tool, then draw a selection rectangle that



Rather than place your subject dead-center, use the photographer's *rule of thirds:* divide your photo into thirds horizontally and vertically, and position the primary subject over one of the four intersecting points, as shown here.

one had sprinkled a dusting of cinnamon across them. And if you've scanned a photograph from a book or magazine, you will notice remnants of the image's halftone dots, which can produce unattractive moiré patterns when you print the image.

Speckles and flecks are often a form of scanner-induced noise—fluctuations in the light source, electrical interference, and so on. To remove these unsightly distractions, use a despeckling filter; PhotoDeluxe, Photoshop LE, and Color It all provide one. The despeckling operation smooths all of the image except for sharp edges.



Automatic Image Enhancement
As for those halftone dots in images scanned from publications, many scanner drivers provide *descreening* features that remove them. Extensis Intellihance also descreens.

What Resolution Should You Use?

If your destination is	scan at this resolution
a 300-dpi printer	100 to 120 dpi
a 600-to-725–dpi printer	150 dpi
a Web site	72 dpi

intensity. Other operating modes let you tweak an image and apply special effects by choosing from small thumbnail views.

HotShots also has unmatched Internet links—it can launch your browser and take you to numerous photography-related sites and newsgroups. And PictureWorks' NetCard lets you e-mail digital postcards—voice-annotated, even.

Lean, Mean Imaging Machines

Perhaps you don't need hand-holding but are simply looking for an affordable, approachable image editor that doesn't require a supercomputer to run. If that's the case, turn to MicroFrontier (*www.microfrontier.com*). No other company offers a broader range of reasonably priced, powerful image editors.

Color It 3.2 from MicroFrontier ($149.95) is a remarkably capable editor that runs in as little as 1.4MB of RAM (Photoshop 4.0 requires more than 8MB). Color It provides a Photoshop-class array of tools and wraps them within an approachable interface. The program's biggest gap is its lack of support for image layers, essential for combining images. (MicroFrontier promises that its $349 Enhance 4.0, due to ship this fall, will support layers.) But Color It also has unique strengths, such as the ability to create and manipulate text directly on the image (rather than having to type it into a dialog box, as in Photoshop and PhotoDeluxe), and commands for creating image maps, used for Web-site navigation.

wwwArt 2.0 from MicroFrontier provides a streamlined set of features geared

to Every Image

encompasses material you want to keep. (Fine-tune the selection's size by dragging its handles.) Finally, click anywhere within the selection. PhotoDeluxe and HotShots work similarly. In Color It, create a selection and then choose Crop To Selection from the Image menu. In Soap, use the crop bars in the Prep Room.

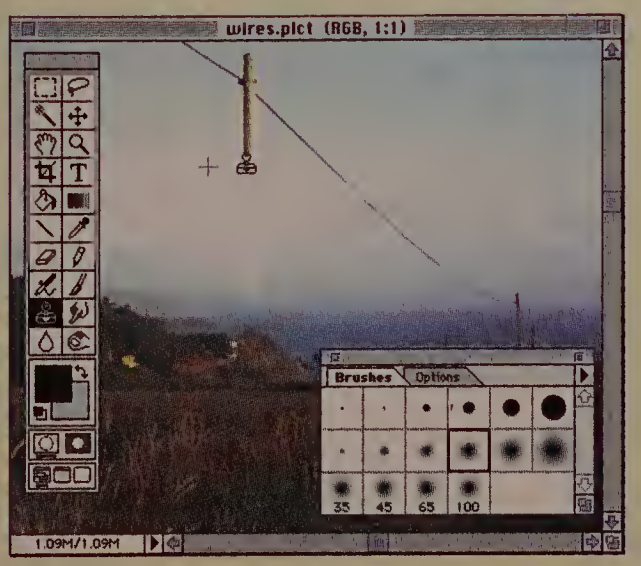
Retouching

This phase involves removing scratches and blemishes and perhaps even distracting elements, such as the utility poles and wires that foul a beautiful view.

Most programs also provide a smudge tool, which is useful for blending cloned areas and smoothing imperfections. Pencil and paintbrush tools are valuable for detail work. To remove a blemish using them, first use the program's eyedropper tool to pick up the color directly adjacent to the blemish, then paint over the blemish.

The preceding steps work in Photoshop LE, HotShots, and Color It.





The most useful retouching tool is the rubber-stamp tool, which enables you to copy, or *clone*, one portion of an image to another area. Activate the tool, point to the area you want to clone, and option-click on it. Then drag across the area you want to paint over, as illustrated here.



Characteristically, Photo Soap marches to a different beat. In addition to a clone tool, it has a heal tool that fixes scratches by pulling in pixels from adjacent areas. It works beautifully for areas in which there are no fine details—such as a scratch across a blue sky—but where details are present, the clone tool does a better job.

Imaging Software That Does More for Less

Company	Product	Star Rating*	List Price	Phone	Comments
Adobe Systems	PhotoDeluxe 1.1	★★★/5.5	$49.00	408/536-6000	Some nice hand-holding features, but advanced modes are complex and completely undocumented.
	EDITORS' CHOICE				
Extensis	Intellihance 3.0	★★★★/8.1	$99.95	503/274-2020	Image-enhancement plug-in for Photoshop, Photoshop LE, and PhotoDeluxe delivers outstanding results.
MetaCreations	Kai's Photo Soap 1.0	★★★★/7.5	$49.95	805/566-6220	Has slick features and a gorgeous but complex interface—and demands a fast Power Mac.
	EDITORS' CHOICE				
MicroFrontier	Color It 3.2	★★★★/7.6	$149.95	515/270-8109	Bargain-priced image editor is fully featured yet runs well on low-end Macs.
	wwwArt 2.0	★★★★/7.1	$19.95	515/270-8109	Simple, bargain-priced editor excels at making Web graphics.
	EDITORS' CHOICE				
PictureWorks	HotShots 1.0	★★★★/7.7	$129.95	510/855-2001	Combines excellent device-specific image-enhancement features with strong manual editing tools.

Based on features, implementation, innovation, ease of use, and value. (See Star Ratings section for full explanation.)

toward producing Web-site graphics—for $19.95 (that's no typo). You can create both client-side and server-side image maps (see *Media*, *Macworld*, July and August 1996). The Get Info command provides estimated download times; the Preview In Browser command automatically switches to your browser and opens the current image; and the HTML To Clipboard command creates the appropriate **<img>** tag, complete with height and width attributes.

Janitor on a Disk

Intellihance 3.0 from Extensis ($99.95; *www.extensis.com*) is the one image-cleanup specialist I tested. A plug-in module for Adobe Photoshop, Photoshop LE, and PhotoDeluxe, Intellihance doesn't fix isolated problems such as scratches or red-eye; rather, it sharpens, color-corrects, and optimizes an image's overall appearance. Click on its Enhance Image button and then sit back and marvel. Intellihance is a miracle worker.

Macworld's Buying Advice

The latest imaging programs make great results easier—and less expensive—to get than ever before. Which one is for you? Among the hand-holders, Kai's Photo Soap is a gorgeous, often-brilliant program that's also reasonably priced, but it isn't easy to learn and it demands a well-endowed Mac. Adobe PhotoDeluxe is a capable package, but its advanced features are difficult to use and it lacks PictureWorks HotShots' array of automatic fix-ups.

For a low-cost, all-purpose image editor, MicroFrontier's Color It is unbeatable. It eats RAM like a bird, yet it does everything most people need (except, as noted, support layers).

And if you already own Photoshop, Photoshop LE, or PhotoDeluxe, pick up Extensis's Intellihance. There isn't a better way to automate your image-enhancement jobs. If Photoshop LE or PhotoDeluxe came with your scanner or digital camera, Intellihance is an ideal add-on.

Pick up these tools and and practice the tips and techniques you see illustrated here. You'll be well on your way toward picture-perfect pixels. m

Contributing editor and *Media* columnist JIM HEID's first imaging program was MacPaint, which he beta-tested before the Mac was introduced.

Preparing Photos for Web Publishing

PREPPING photos for the Web involves saving them in JPEG format, which compresses images for faster downloading. (GIF, the other popular Web-graphics format, isn't suitable for photos; see *Media*, May 1996.) Reducing the image dimensions also speeds download.

Save in a Native Format

Before compressing and resizing an image, save it in its native format—for example, PICT. But retain a full-resolution, full-size version of the image for possible future use.

Resize

Generally, keep Web graphics under 400 pixels in either width or height—smaller is faster. Use your imaging software's Scale or Image Size command to resize. Be sure to maintain the image's original proportions, lest it appear stretched or squished. Most resize dialog boxes have a check box labeled Maintain Proportions or Keep Aspect Ratio. Check this box, and you need enter a value for only one dimension; the program figures out the other.

Save as JPEG

JPEG offers several quality options, usually labeled Low, Medium, and High. Start at Low—results can be surprisingly good, and the space savings can be astonishing. If the image is unsatisfactory, return to the original file and try Medium.

EDITORS' CHOICE

Low-Cost Image Editors

★★★★/7.6 **Color It 3.2** This trim and efficient program provides solid editing features and runs well on slower Macs. **Company:** MicroFrontier (515/270-8109, *www.microfrontier.com*). **List price:** $149.95.

★★★★/7.7 **HotShots 1.0** This versatile, approachable program combines direct support for numerous scanners and digital cameras with easy-to-use, effective image-enhancement features. **Company:** PictureWorks Technology (510/855-2001, *www.pictureworks.com*). **List price:** $129.95.

Image-Enhancement Plug-In

★★★★/8.1 **Intellihance 3.0** This Photoshop-format plug-in provides one-button image enhancement. **Company:** Extensis (503/274-2020, *www.extensis.com*). **List price:** $99.95.

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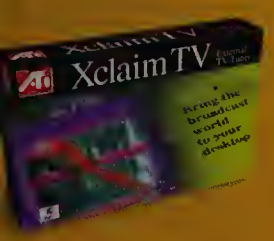
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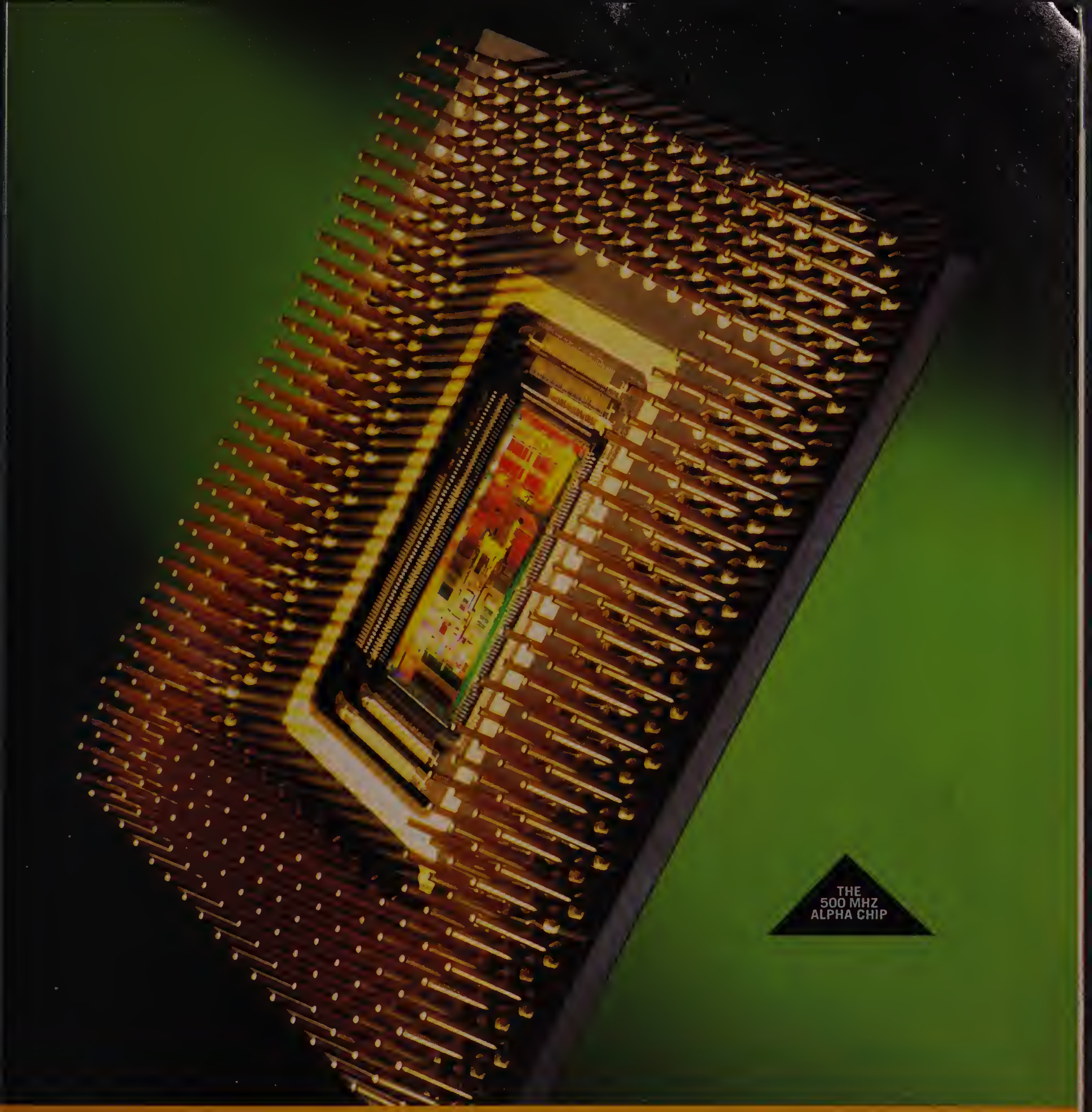
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PRINT IT

9 color printers under $500 deliver vibrant results

by Joseph Schorr

YOU'VE CREATED GORGEOUS color images on your Mac—scanned in or captured with a digital camera. Now comes the budget-minded digital artist's biggest challenge: how to print those images so they look every bit as sharp and vibrant on paper as they do on screen—without spending thousands on a printer.

Surprisingly, the perfect solution may be a low-cost color ink-jet printer. Forget about the washed-out colors, fuzzy resolution, and messy ink smears of yesterday's ink-jets; the best of these compact personal printers can produce rich, dazzling color images at a crisp 720 or 1440 dots per inch, delivering output easily rivaling that of color laser printers.

Of course, these machines aren't as *fast* as laser printers, which can spit out up to five color pages per minute. They're also not PostScript printers, so to output Adobe Illustrator or Macromedia FreeHand files at high resolution you'll need additional PostScript-rendering software, which costs around $100.

To find the best low-cost options for printing high-quality digital images, Macworld Lab tested nine color ink-jet printers, all priced under $500: Apple Computer's (*www.apple.com*) three newest StyleWriters; three outstanding printers from Epson America (*www.epson.com*); and new models from Hewlett-Packard (*www.hp.com*), Canon (*www.ccsi.canon.com*), and Alps USA (*www.alpsusa.com*). (The Alps printer technically isn't an ink-jet—it uses dry-ink ribbons, but it aims at the same market.)

First Priority: Quality

What counts most when you're printing color graphics, especially photos, is image quality. You want to see rich, accurate colors; smooth gradients; and sharp focus.

You get all of the above with Epson's ink-jets, which have redefined what we expect from these printers. The Stylus Photo in particular towered over its rivals in our Adobe Photoshop and Illustrator tests, with the clearest images and truest colors.

The Stylus Photo is the only ink-jet available that uses a six-ink system instead of the usual four-ink system. In addition to cyan, magenta, and yellow, it uses a light cyan and a light magenta ink to yield smooth transitions and more-accurate colors. You get rich, vibrant, photo-quality output, especially when you print on Epson's photo-quality glossy paper or its top-of-the-line (and expensive) glossy film.

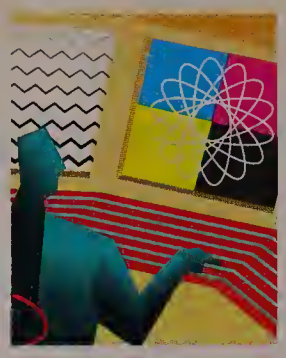
Epson's two other ink-jets, the Stylus Color 600 and 800, also rendered superior results in our quality tests, delivering sharp, clear prints with smooth color transitions and beautiful color. Both can print at a maximum resolution of 1440 by 720 dpi, but we didn't find the higher-resolution images much better than the 720-by-720-dpi ones. While both offer the same resolution, the 800 has more ink nozzles, a faster print engine, and a faster serial port for improved speed. The 800's separate black ink cartridge is also larger, so you don't have to replace it as often.

The Quality Challenge

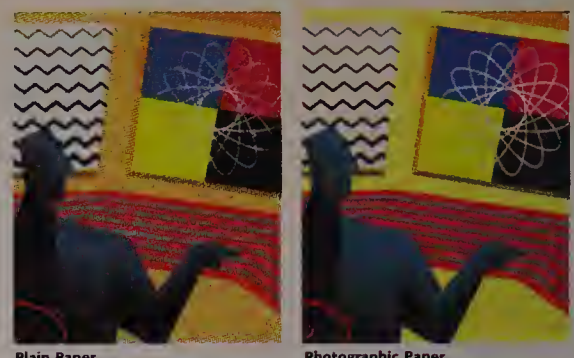
The Canon BJC-4550 and the Apple Color StyleWriter 4500 and 6500 also offer a photo-quality mode, but these, unlike the Epsons, use special ink kits in place of standard ink cartridges. Switching from standard to photo-quality markedly improves these printers' output, especially when you print on glossy photo

Ink-Jets Deliver Top-Notch Output

We were delighted with the photographic-quality output that the newest ink-jet printers can produce. To compare output, we scanned two samples from each of the printers: an Illustrator file printed on plain paper using the printer's default setting and the same file printed on photographic paper using the printer's best setting. Notice how crisp the results are on the photographic paper, but remember this is a more expensive and time-consuming option. When shopping for a printer, insist on seeing output on plain paper using the default setting, since that's what you'll probably use more frequently.

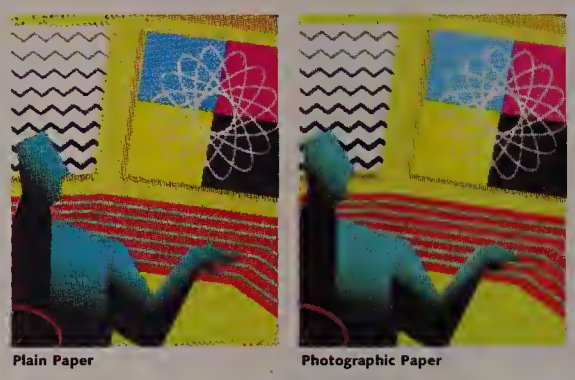


Original Image For comparison purposes, here is the test Illustrator file sent directly to a 2400-dpi imagesetter, without the intermediate steps of printing on an ink-jet printer and scanning.



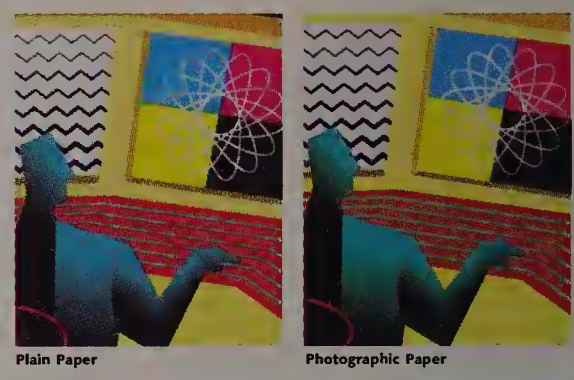
Plain Paper | Photographic Paper

Alps MD-1000 The MD-1000's dry-ink ribbons produce washed-out, lifeless colors. This slow, quirky printer connects via a SCSI port and offers poor output on plain paper.



Plain Paper | Photographic Paper

Canon BJC-4550 The BJC-4550 is the only tabloid-size printer in this price range, but it's slow. Special inks are available for photo printing, but the color banding and grainy output are disappointing.



Plain Paper | Photographic Paper

Epson Stylus Photo The Stylus Photo offers the smoothest color transitions, even on plain paper, thanks to its six-ink printing system. It produces the best photo-quality output available in this price range.

paper, but the results still couldn't quite compare to the Stylus Photo's images.

Remember, too, that the Stylus Photo is revved up for high-quality photo printing right out of the box; you don't have to buy special ink cartridges, and you never have to swap standard and photo ink cartridges, as you do with the StyleWriters.

The Alps MD-1000 dry-ink printer also claims to offer photo-realistic output at a resolution of 1200 by 600 dpi, but the results were disappointing. The MD-1000 uses a system of four dry-ink cartridges resembling typewriter ribbons. In our tests, the cartridges sometimes left streaks on the pages. Also, images generally appeared washed-out, lacking intensity; blacks weren't very deep, and colors were dithered.

Unlike its costlier cousin the MD-2300, the MD-1000 doesn't use Alps photo-quality inks, whose dye-sublimation technology produces dazzling photographic results. To make matters worse, the MD-1000 did a very poor job on plain paper. This printer's one strength is text, which was razor-sharp on high-quality paper.

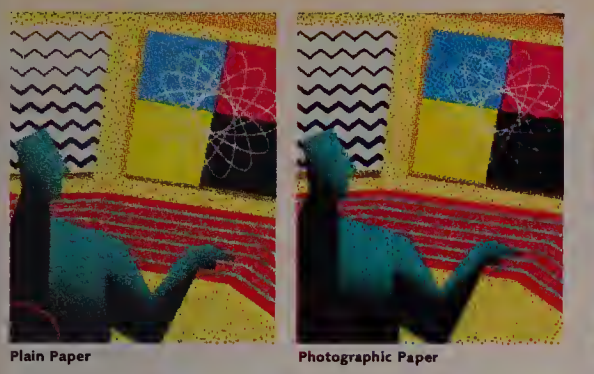
Better at Text

For printing black text on any kind of paper, the Hewlett-Packard DeskJet 870Cse is one of the best ink-jet printers; even in its default mode, the 870Cse produced better-looking text than all the

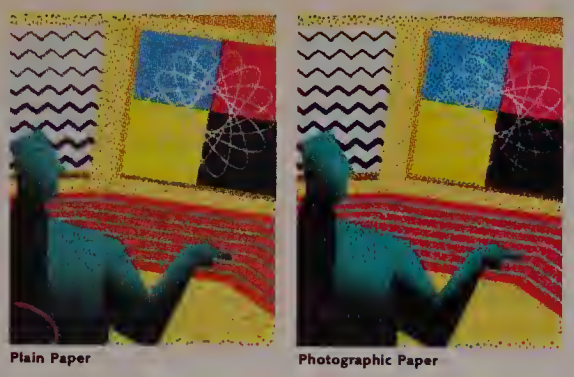
The Spectrum of Ink-Jet Options

Company	Product	Star Rating*	Price	MAXIMUM RESOLUTION (IN DPI) Black and White	MAXIMUM RESOLUTION (IN DPI) Color	MAXIMUM PRINT SPEED Black and White	MAXIMUM PRINT SPEED Color	COST OF INK CARTRIDGES Black and White	COST OF INK CARTRIDGES Color
Alps 408/432-6000	MD-1000	★★★/5.5	$399	600 × 1200	600 × 1200	240 characters per second	NP	$6.99	$6.99 each for cyan, magenta, and yellow
Apple Computer 408/996-1010	Color StyleWriter 4100	★★★/6.2	$240	600 × 600	600 × 300	4 ppm	1.5 ppm	$29.00	$29.00
	Color StyleWriter 4500	★★★/6.9	$340	600 × 600	600 × 300	5 ppm	1.7 ppm; 0.25 ppm PhotoGrade	$29.00	$29.00
	Color StyleWriter 6500	★★★★/7.7	$470	600 × 600	600 × 300	8 ppm	4 ppm	$29.00	$29.00 (cyan, magenta, and yellow); $35.00 (PhotoGrade
Canon 714/438-3000	BJC-4550	★★★/6.9	$499	720 × 360	720 × 360	5 ppm	1 ppm	$29.99	$49.95 (photo ink)
Epson 310/782-0770	Stylus Color 600	★★★★/8.9	$299	1440 × 720	1440 × 720	6 ppm	4 ppm	$24.95	$29.95 (six-color)
	Stylus Color 800	★★★★/8.9	$449	1440 × 720	1440 × 720	8 ppm	7 ppm	$29.95	$29.95 (six-color)
	EDITORS' CHOICE Stylus Photo	★★★★★/9.1	$499	720 × 720	720 × 720	NP	3 × 5 photo, 90 seconds/8 × 10, under 6 minutes	$24.95	$24.95 (six-color)
Hewlett-Packard 408/571-2304	DeskJet 870Cse	★★★★/7.8	$399	600 × 600	600 × 300	8 ppm (text)	4 ppm	$32.95	$34.95

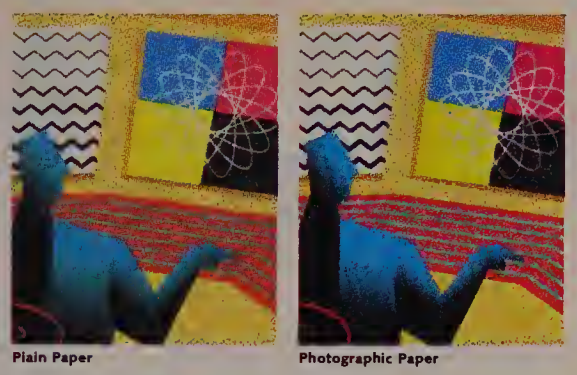
NP = not provided. * *Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See* Star Ratings *section for full explanation.)*



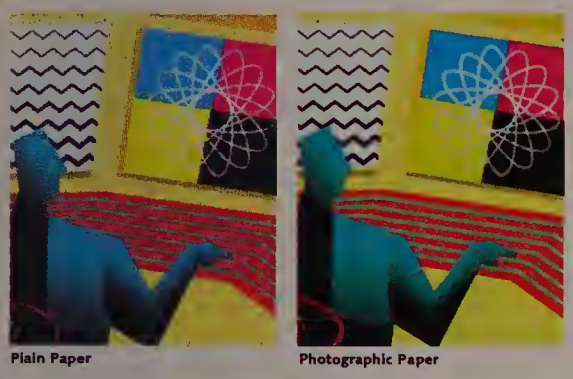
Apple Color StyleWriter 4100 This low-priced printer gives you what you expect—mediocre output, mediocre speed. With no PhotoGrade option, its best output is crude compared to that of the other models.



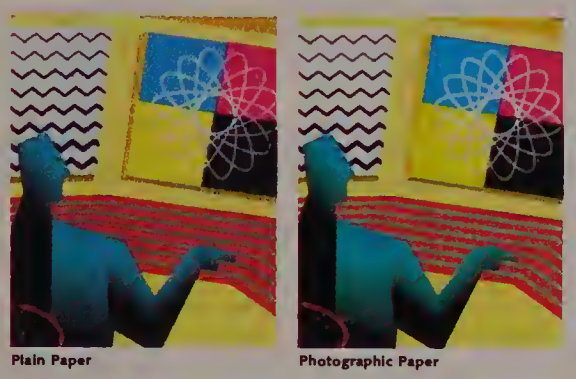
Apple Color StyleWriter 4500 The 4500 offers vivid colors and improved text printing over earlier StyleWriters but produces crude color transitions and grainy output, especially on plain paper.



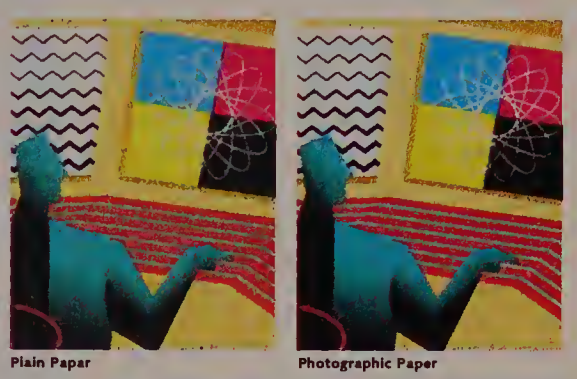
Apple Color StyleWriter 6500 Apple's best StyleWriter produces decent photo output when you use the PhotoGrade ink cartridge. On plain paper, output is washed-out and grainy.



Epson Stylus Color 600 The 600 delivers virtually the same great output as the Stylus 800, but it's slower and doesn't support the optional Ethernet upgrade. At less than $300, it's an excellent value.



Epson Stylus Color 800 Crisp edges, fine resolution, and rich color saturation make the Stylus 800 a great all-purpose printer. It's also got a speedy print engine and optional Ethernet support.



HP DeskJet 870Cse The 870Cse is a fast and dependable printer for printing black text, but even on high-quality jobs image output is grainy, with poor color reproduction.

other printers in highest-quality mode.

The DeskJet 870Cse, the big winner when *Macworld* last tested ink-jets (see "Color Ink-Jet Jewels," February 1997), didn't fare as well this time around because its color output paled next to the photographic richness and clarity of the Epson printers' output. In Photoshop tests, for example, the DeskJet printout was relatively crude, with garish colors and lots of dithering.

Given that the newest StyleWriters are all built around Hewlett-Packard print engines, it's no surprise that their output closely resembles that of the DeskJet 870Cse. The 4500 and 6500 both did a great job on text—much better than the old StyleWriter 2500, which they replaced—but they produced less-than-stunning color images. Using standard (instead of PhotoGrade) inks, the 6500 managed to produce slightly better output than the HP, though still inferior to any of the Epson printers'.

Speed—or Lack Thereof

Ink-jet printing is inherently slow; pages are printed line by line as a bulky ink cartridge and print head slide back and forth across each sheet of paper. You have to think in terms of minutes per page instead of pages per minute.

The fastest printer we tested, the Sty-

The Money of Color

YOU DON'T HAVE to spend a lot to set yourself up with a photo-realistic color ink-jet printer, but if you plan to do a lot of color printing, you'd better have a generous budget for paper and ink. Photo-quality output of this type comes at a price.

Don't Waste Ink

A $24.95 color cartridge for the Epson Stylus Photo is rated to last 190 pages, but that's assuming you cover just 15 percent of each page (an area about the size of a floppy disk) with ink and that you print at just 360 dpi. Print a batch of 8-by-10 glossy photos at 720 dpi and the same cartridge may not last for more than 60 pages; meaning that you use up 41 cents' worth of ink every time you print a page.

Printing with the Canon's small ink tanks can cost even more. The Photo Bubble Jet Cartridge runs $49.95 and lasts for only about 90 pages—again, at only 15 percent coverage. On larger, color-saturated images, you could end up replacing the cartridge every 20 pages or so.

Hewlett-Packard's DeskJet 870Cse, with its larger-capacity ink tanks, is the most economical of the ink-jets we looked at. The DeskJet's $34.95 color cartridge is rated to last for 450 pages at 15 percent coverage.

Spring for Paper

Then there's paper. All these printers support plain-paper printing, but to get photo-quality results you *must* spring for higher-grade ink-jet or photo papers, which cost considerably more than plain paper. Plain paper absorbs too much ink, resulting in fuzzier images and oversaturation that causes the paper to warp.

Epson's photo-quality glossy paper is about 65 cents per sheet. The photo-quality glossy film (for highest-quality prints) costs $2.13 per sheet. Canon's high-resolution paper costs about 14.4 cents per sheet, while the high-gloss film runs $1.40 per sheet.

Money-Saving Tips

Whenever possible, use these printers in their lower-resolution proofing modes, printing at 180 or 360 dpi instead of 720 dpi; you'll use a lot less ink. Switching simply involves choosing a different quality setting in the Print dialog box.

Also, do all your test prints and early proofs on plain paper instead of the higher-priced photo paper. (The printers have only one paper tray, but it's easy to swap paper.) The colors won't be as vibrant, but you'll get a good idea of what your final output will look like. The Epson printers again emerge as winners; they yield the best results, even when printing to plain paper.

Macworld LAB TEST

Which Ink-Jet Is Worth the Wait?

As these test results show, there are two kinds of color ink-jet printers—slow and *really* slow. All of these printers keep you waiting, but only a few of them—namely, the Epson printers—make the wait worthwhile. The Stylus 800 generated some of the best-quality output and was also the fastest overall in default mode. While not as fast, the Stylus Photo produced superior photographic output in its best setting. On the other hand, the Canon BJC-4550 and Alps MD-1000 were losers all around, with slow print engines and disappointing output.

Best result in test. Shorter bars are better. Times are in seconds.

	Print Mode	Short Multi-font Memo	Long Single-Font Report	Spreadsheet	Illustration	Bitmapped Photograph	Newsletter	Web Browser
Alps MD-1000	Default	238	887	487	421	374	223	532
Alps MD-1000	Best	249	891	563	496	428	253	571
Apple Color StyleWriter 4100	Default	72	188	376	277	273	153	261
Apple Color StyleWriter 4100	Best	116	719	744	555	554	256	528
Apple Color StyleWriter 4500	Default	67	183	363	260	256	145	243
Apple Color StyleWriter 4500	Best	112	682	720	534	524	246	501
Apple Color StyleWriter 6500	Default	48	129	162	183	192	89	153
Apple Color StyleWriter 6500	Best	71	199	322	360	419	160	279
Canon BJC-4550	Default	65	272	311	302	337	123	273
Canon BJC-4550	Best	253	1948	1126	747	713	494	775
Epson Stylus Color 600	Default	48	321	159	102	93	61	104
Epson Stylus Color 600	Best	155	811	466	296	317	244	335
Epson Stylus Color 800	Default	27	159	159	70	67	44	64
Epson Stylus Color 800	Best	96	876	328	252	284	149	235
Epson Stylus Photo	Default	92	784	239	158	154	125	168
Epson Stylus Photo	Best	162	1568	491	328	387	249	373
HP DeskJet 870 Cse	Default	52	127	189	166	190	105	153
HP DeskJet 870 Cse	Best	93	185	358	258	331	183	273

Behind Our Tests

Macworld Lab tested the speed of each printer using a series of test files representative of typical home- and office-oriented jobs, including a ten-page Microsoft Word text-only document using one font; a two-page text-only Word file with multiple fonts, sizes, and styles; a Microsoft Excel spreadsheet; a ClarisWorks newsletter with multiple fonts plus PICT and EPS graphics; a Netscape Navigator Web page; an Adobe Illustrator–generated graphic; and a full-color photograph scanned in Adobe Photoshop. All tests were performed on a Power Macintosh 7500/100 running System 7.5.5, with 32MB of RAM, a 256K cache, a 17-inch Apple monitor set to 256 colors, a disk cache set to 1024K, virtual memory and RAM disk disabled, and Adobe Type Manager 3.9 enabled.—**Macworld Lab testing supervised by Mark Hurlow**

lus 800, still took more than a minute to print one full-page color image at its highest speed. Printing in high-quality mode more than quadrupled that output time to over 4.7 minutes. The Stylus 600, which has a slower print engine and serial port than the 800, tackled the same file in about 5.3 minutes in high-quality mode.

The superior output of the Stylus Photo takes even longer to roll out of the printer; in our tests, a full-page color Photoshop document at the highest quality took nearly 6.5 minutes. And even with the Stylus Photo's high-speed (and lower-quality) setting, the same job took more than 2.5 minutes. That's slow—but not as slow as the BJC-4550, Alps MD-1000, or StyleWriter 4100 and 4500, which took even longer to slog through the same jobs. The BJC-4550, for example, took more than 11 minutes to output one page in our Photoshop test.

The DeskJet 870Cse, which delivered the fastest performance when printing text, offered middle-of-the-road speed on high-quality color jobs. The StyleWriter 6500 also sped through text jobs but couldn't keep up with the Epsons when printing images from Photoshop or Illustrator.

Speed should be a secondary concern when you're selecting an ink-jet to output your images. What you're really looking for in this type of printer is sharp, vivid output with good color fidelity. Every one of these printers kept us waiting, but in the case of all three Epson printers, the wait was always worthwhile.

Macworld's Buying Advice

For the best photo-quality output from an ink-jet printer, buy the Epson Stylus Photo. Considering this printer's $499 price tag, the print quality is truly dazzling. It's not the fastest color ink-jet—that distinction belongs to its cousin the Stylus 800—but it's not the slowest either, and its output is truly spectacular.

Printing black text is a job that most of these color ink-jets don't do all that well. If crisp, black text is your main concern, the HP DeskJet 870Cse and Apple StyleWriter 6500 are your best options.

For a good balance of color quality, crisp text, and speed, your best bet is the $449 Stylus 800, which renders excellent color images, ranks close to the top on text quality, and has the speediest print engine. If you can live with slower performance, opt for the Stylus 600; it delivers the same output and saves you another $150.

The bottom line: You really can't lose with any of the Epson trio—they all provide superb low-cost solutions for turning the images you've created on screen into genuinely dazzling prints. m

Contributing editor JOSEPH SCHORR, a veteran ink-jet user, bought the original StyleWriter six years ago. He coauthored *Macworld Mac Secrets*, fourth edition (IDG Books Worldwide, 1997).

EDITORS' CHOICE

★★★★★/9.1 **Epson Stylus Photo** It's slower than the similarly priced Stylus 800, but its photo-quality output produced gasps of delight from our panelists. **Company:** Epson America (310/782-0770, *www.epson.com*). **Company's estimated price:** $499.

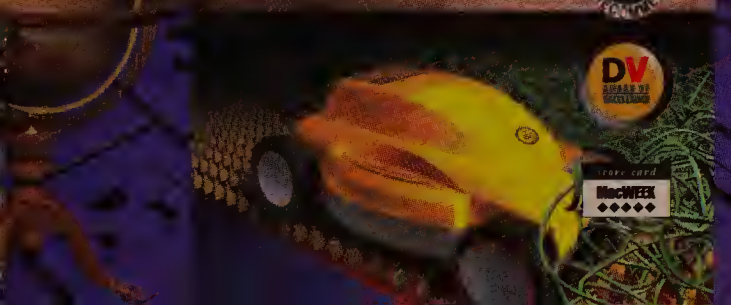
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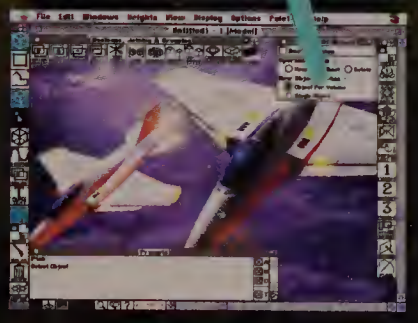






3D solid and surface modeling at its best ...

form•Z



Henk Dawson,

of Dawson 3D, Inc., Seattle, Washington, is a seasoned professional in the 3D medium, combining his love for both art and technology. After working at two Seattle area ad agencies, he went on to start his own business and for the last seven years, he has been creating 3D imagery for clients such as Apple, CompuServe, Fox, IBM, Microsoft, Nintendo, and Sun. Through the advancement of the digital tools available his illustrations have become significantly richer and more complex than anything he could create with traditional means. How does he do it?

Software programs, such as form•Z, enable me to create complex models which I can then incorporate into my photorealistic imagery. I find form•Z to be a powerful program with well implemented tools for creating simple to complicated shapes. I especially appreciate the fast screen redraws which bring much needed spontaneity into the digital creative process. I used to work with several modelers to get my project accomplished, but now I use form•Z for just about everything. I am impressed with the company's commitment in assisting their users, and in staying on the leading edge of the modeling technology.





See for yourself: download a demo for MacOS or Windows from our web site at **www.formz.com.**

As a designer, you need to visualize complex forms and to imagine shapes that do not yet exist. You frequently race against insane deadlines, while your clients grow impatient. That's when you need the modeling power of **form•Z**.

form•Z lets you create a vast variety of forms with unprecedented ease. It offers an extensive array of unique 2D and 3D form sculpting capabilities.

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Add as many **layers** as you need, work with floating point **precision** using simultaneous **graphic** and **numeric input**. If you're unhappy with your new design, **unlimited undos** are always at your fingertips.

RenderZone

When you're done modeling, you can use **RenderZone**'s state of the art shader technology to produce your photorealistic images at impressive speeds. Or you can transfer your models smoothly into your favorite animation program, using **form•Z**'s extensive import/export formats. Flexibility of this caliber has made **form•Z** the most effective modeling complement to many popular animation programs.

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WE WORK OUR PIXELS HARDER THAN ANYONE ELSE

Our resolution: never produce a high resolution camera without giving the pixels something to do. Our resolution is 1024 x 768 pixels and all 810,000 of them have plenty to keep them occupied. The key is our sophisticated imaging system: the multiple compression ratios that give you a choice of both image quality and size as well as the color management system that rewards you with rich, vibrant images. The result:



every one of our pixels earn their keep.

SHOOT, SHOOT, SHOOT

There are no restrictions on the number of photos you can capture with the D-320L. The 2 megabyte SmartMedia™ card that comes with the camera (4MB optional) has an unlimited capacity. You just simply download the images from the card to your computer by means of the serial cable or the optional PCMCIA or 3.5" floppy disk adapters. Or you can insert a new card anytime and keep on shooting.



Hook up the D-320L to the TV and watch your shots come to life.

NO COMPUTER NECESSARY

For those who don't want to be married to a computer day after day, there's emancipation. The D-320L has video output that directly hooks to your TV. The entire family can now view your shots without the need for a computer. And the images can be videotaped on a VCR and sent to relatives or business associates.

Another direct connection is from the camera to the new Olympus P-300 personal photo printer. In a little over a minute you can print true photo quality images directly from the camera. Finally, digital independence!

OUR REVEALING BACK

It tells you a lot. For one thing, there's the new 2" screen that displays real images in brilliant color. You can use it as a viewfinder or to review your shots one at a time or nine at a time. Or use it to present a slide show by automatically displaying each image one at a time. And if stop action inspires you, the D-320L can capture 9 shots per second in a single frame.



Connect the camera to our photo printer and presto! Get the photo you want, when you want it.

A FEW FINAL BYTES

Note: our more economical D-220L, with a resolution of 640 x 480, is ideal for smaller images (snapshots, the web, electronic presentations) and still gives you all the features and image quality of the D-320L.

Note: last year's Olympus digital cameras won more awards than any other digital cameras. Just imagine what this year will bring.

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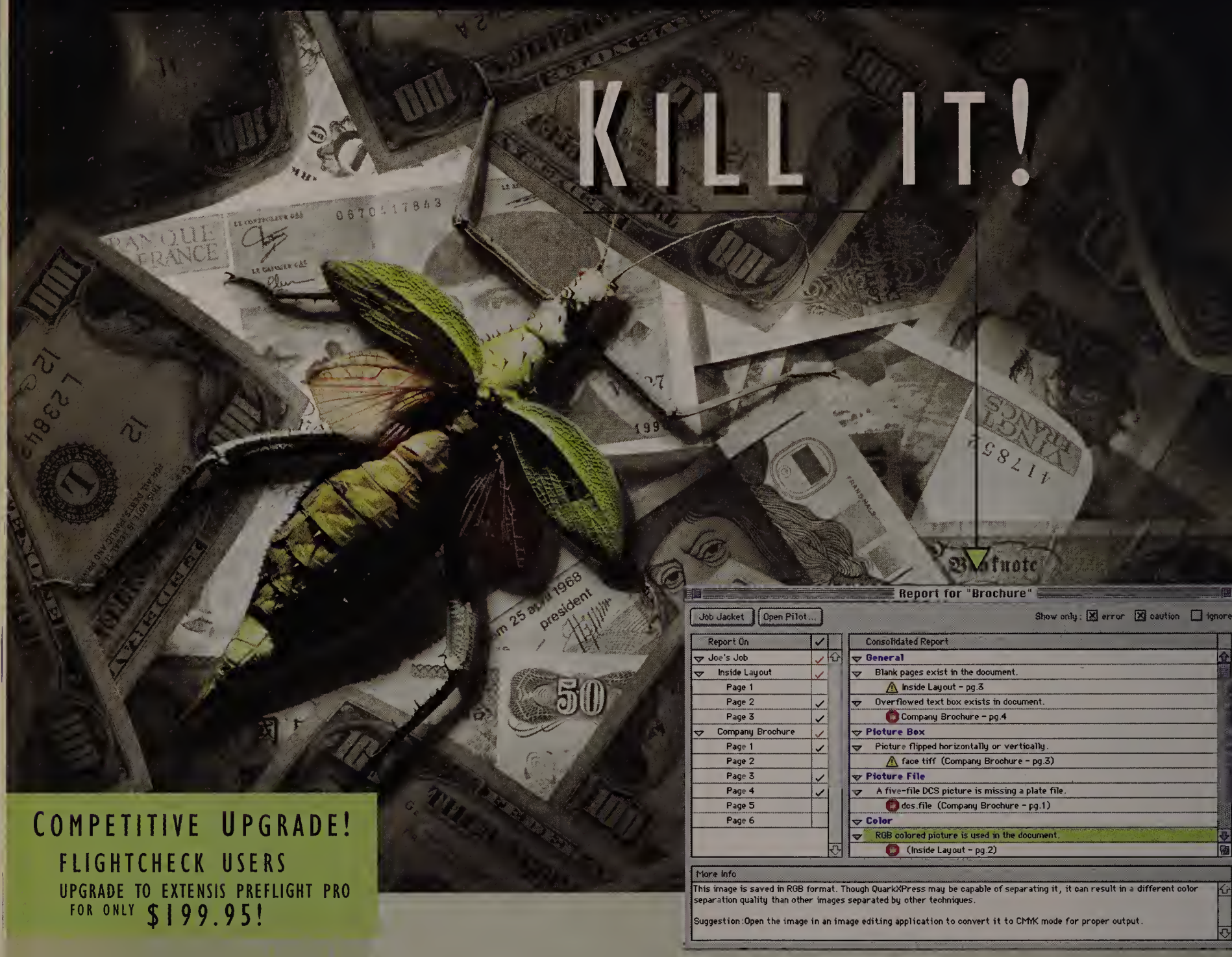
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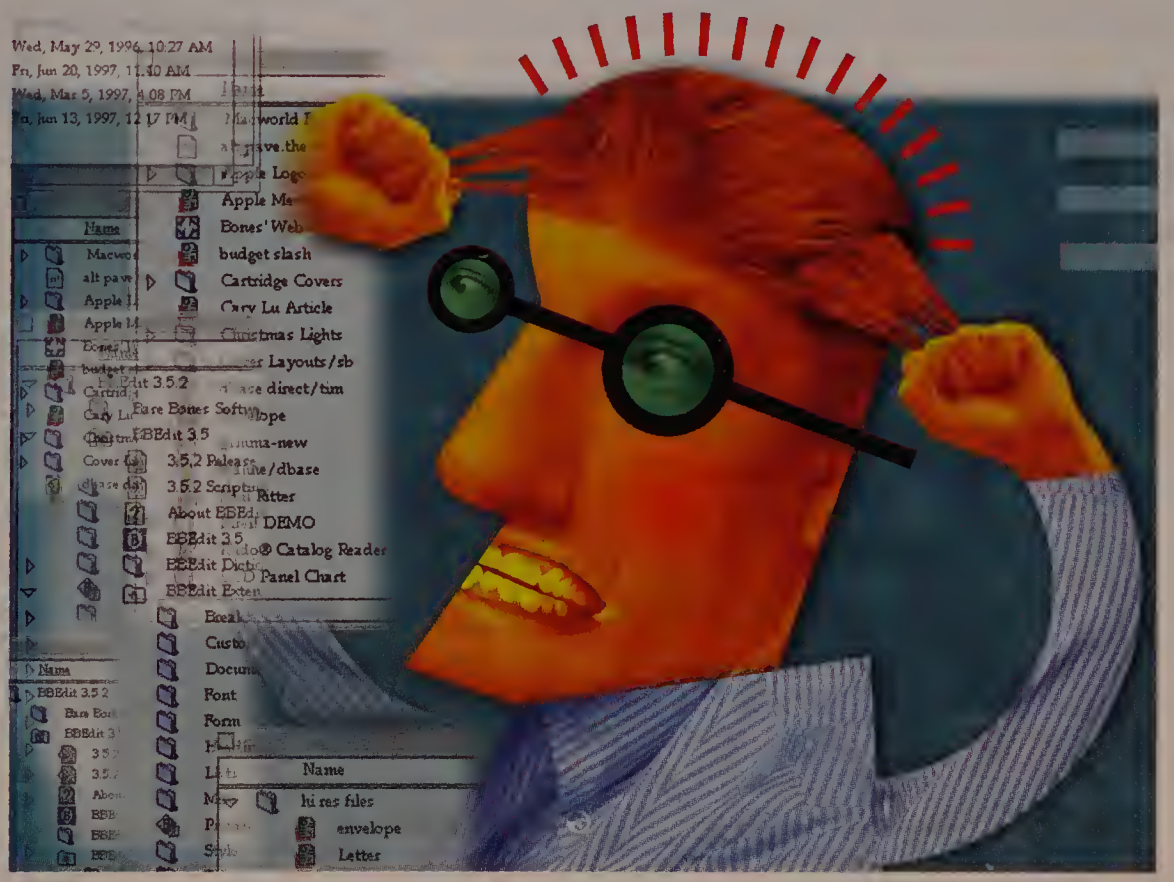
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Secrets

The List View Scandal of '97

CONTROVERSIAL CHANGES MAKE MAC OS 8'S FINDER BETTER—AND WORSE

by Joseph Schorr



You'll hardly notice one of the most dramatic changes introduced in Mac OS 8 when you first start using the new system software. It's not the obvious stuff—not the 3-D icons, or the beveled platinum-colored windows, or even the spring-loaded folders and pop-up windows. No, it's the strange new way that Finder 8 handles list views. You zip around your system, merrily opening and closing windows, when suddenly it hits you: there's no longer one set of preferences that controls every list view on your Mac. Now each and every window on your system has its own list-view preferences (set via the View Options command in the Finder). Depending on whom you ask, this fundamental change is either a long-awaited refinement or a system-hobbling backward step.

Upgrade or Downgrade?

Some users find it positively liberating that at last you can apply view preferences on a window-by-window basis. It means you can turn on Calculate Folder Sizes in a single window—and keep it turned off everywhere else. You can show the Labels column only in windows containing files that are actually labeled, and keep the column neatly hidden in windows where it isn't needed. You can set up one window to display only the creation date of each file, while another window shows only the modification date. Just think: unparalleled freedom. Unparalleled flexibility.

And unparalleled hassles, say the critics. The problem? What if you *want* to set such list-view options globally? What if you want *every* list view on your Macintosh to always display the smallest icons, the modification date, and the size and label fields; and you want Calculate Folder Sizes always turned on? There's no way to do it. Apple forgot to include a command for setting global preferences. I've already heard people pining for System 7.6, longing for happier days when they could set such preferences once and for all. Instead, try these tips for taking advantage of Mac OS 8's new approach to list views—and coping with its deficiencies.

The Three Rules

Actually, you have more control over Mac OS 8's list-view settings than you might think. The trick is understanding how these options work and how to make them work for you.

continues

Your Comments Are Welcome . . .

EVER SINCE THE EARLIEST DAYS OF SYSTEM 7, YOU'VE BEEN ABLE TO include the comments that appear in each file's Get Info box in the Finder's list views—but almost nobody ever has that option turned on. For one thing, almost nobody actually uses the comments field. And until now, turning on the Comments field in list views activated the field in every list view on your Mac.

However, with Mac OS 8's window-by-window approach to list views, you can display comments in specific windows only. To make the comments visible, just select the Comments check box in the Show Columns section of the View Options dialog box (see Figure 1).

Including comments makes a lot of sense if you save files from the Web. Whenever you save an HTML document as a text file, Netscape Navigator automatically places the document's complete URL into the comments field. If you set up a list view that includes comments, you'll be able to see at a glance the origin of each file you've saved. You can also use comments to provide easily accessible notes and reminders about your files (see Figure 2). And because you can type anything you want into the Comments field, you can also use the Comments column to create a custom sort order for a particular window—without having to modify file names with leading spaces or returns. Just type a number or letter in the Comments field of each file's Get Info window, then click on the Comments column header in the Finder window to sort the files by the numbers or letters you've typed.

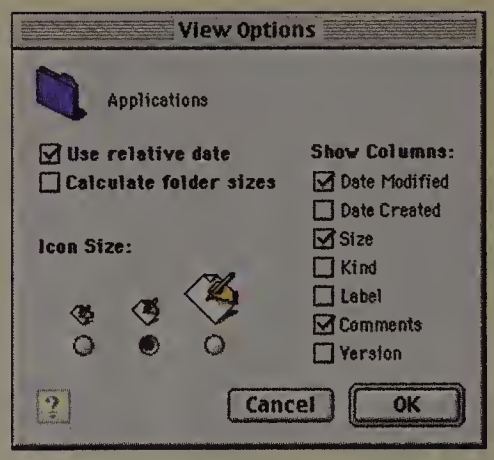


Figure 1

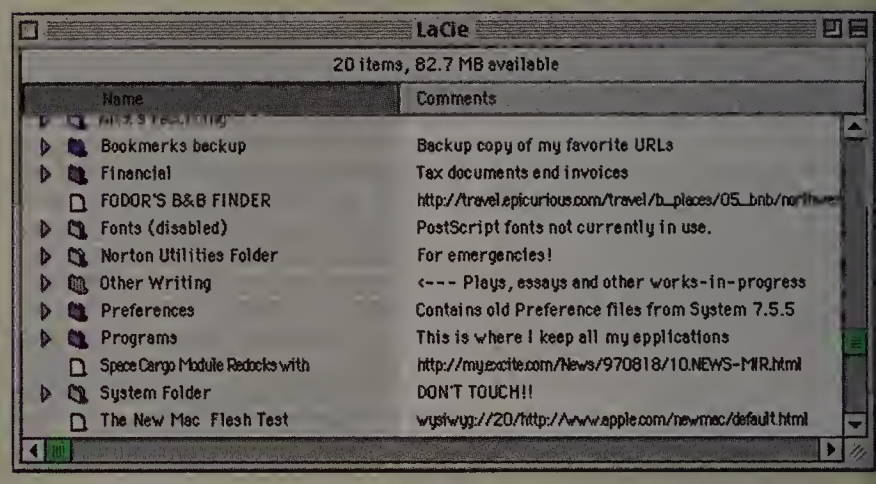


Figure 2

First of all, get to know the three underlying rules that govern the behavior of list views in the Mac OS 8 universe.

• There is one default list view hardwired into Mac OS 8: files appear with a medium icon; Calculate Folder Sizes is turned off; Use Relative Date is turned on (Today and Yesterday, instead of Tuesday and Monday); and three columns are displayed in addition to the file name—Date Modified, Size, and Kind. If you change an existing window from the icon or button view to the list view for the first time (that is, you've *never* displayed the window in list view before), then this default list view is what you'll get.

• Once you change a window's list-view options—adding or removing columns, selecting a different icon size, and so on—the Mac stores these changes *permanently*, even if you switch the window back to an icon or button view. In other words, if you change a window from an icon view to a list view, the list-view options you get will be exactly the same ones you set up the *last time* you opened that window in a list view.

• Finally, there's the all-important rule of List View Inheritance: New folders *always* inherit the list-view settings of their parent (enclosing) windows—columns, icon sizes, sort order, everything. (This is true even if the parent window is set to display an icon or button view. When you switch the newly created folder window to list view, the list will have the same list-view options that the enclosing folder had the last time *it* was displayed in list view.) The bottom line is that a new folder will always have the list-view characteristics of the folder in which it was created.

Equipped with the three rules stated above, not only can you predict what will happen when you switch to a list view, but you can also pretty much control what that view is going to look like. For example, knowing that a new folder inherits the list view of its enclosing window, you can in effect create a default for new folders. Just set up your hard-drive window with the list-view options of your choice; from then on, every folder you create from that window will possess exactly the same list-view options. The key is to set your preferences right away—before you've created hundreds of folders and subfolders.

Life with Lists

Granted, this isn't quite the same as having global settings that apply these preferences to all windows—both existing and new—in one step. On the other hand, you shouldn't have to set list-view preferences for each individual window on your system if you create new folders with these rules in mind.

Remember that Mac OS 8's new contextual pop-up menus eliminate at least some of the drudgery when you need to reset a window's view options. In the old days, changing views and view options meant visiting the Finder's View menu and opening the Views control panel. Now, you can simply control-click on a window to access a pop-up menu that lets you switch between icon, button, and list views, or choose the View Options command and make other adjustments. Let's hope that in Allegro, Apple's next Mac OS release, there will be a way to control list views individually *and* globally. **m**

JOSEPH SCHORR is coauthor of *Macworld Mac Secrets*, fourth edition (IDG Books Worldwide, 1996). He is a compulsive list-view user.

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Pick up any computer magazine and you're sure to see the hype about 3D acceleration. And amidst the 3D buzz are umpteen companies clamoring to sell you their graphics card, with promises of "greater speed," "deeper colors", and a graph that supposedly proves their claim. But deciphering the difference between one card and another requires a magnifying glass, a dictionary and a degree from MIT.

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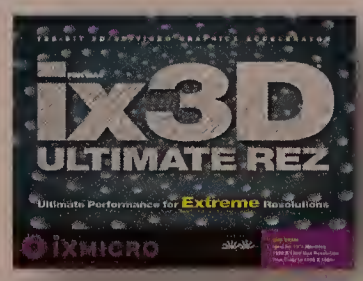
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"And we can kick our rivals in the bottom!" said the boss.

Tim and the boss laughed. "Ha, Ha, Ha!"

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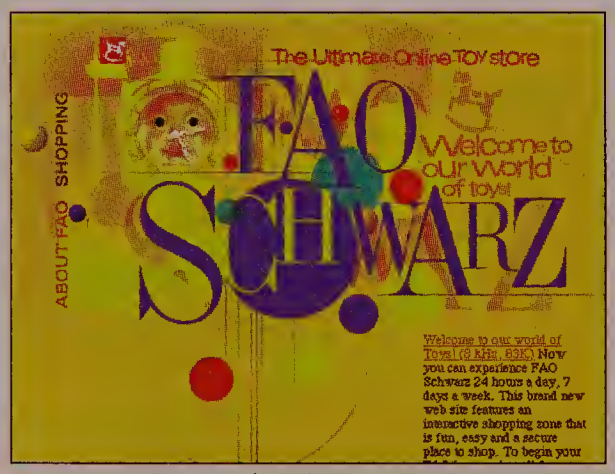
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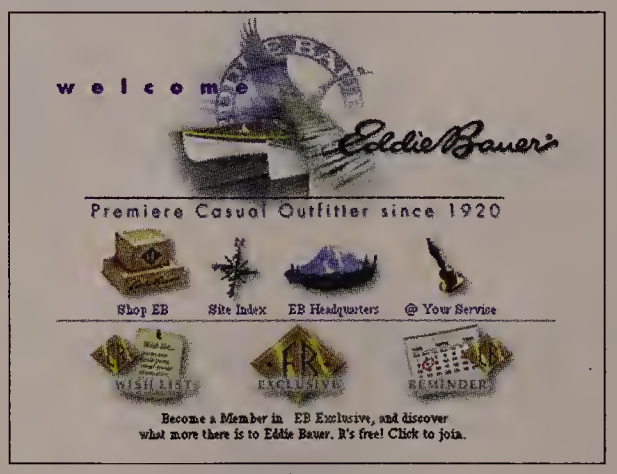
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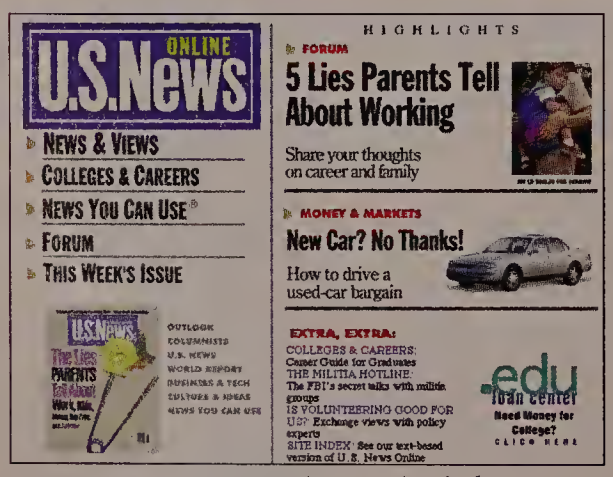
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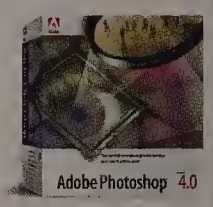


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Quick Tips

Tips, Tricks, and Shortcuts

by Lon Poole

Everyone knows that to adjust the sound level in a QuickTime sound clip you click the speaker icon to reveal a sliding volume control. Do you know the shortcut for turning the sound on and off? Lucie Robineau of Saint-Léonard, Quebec, Canada, has the answer: option-click the speaker icon. Also, you can set the sound level louder than its normal maximum by holding down the shift key while adjusting the sound level with the slider.

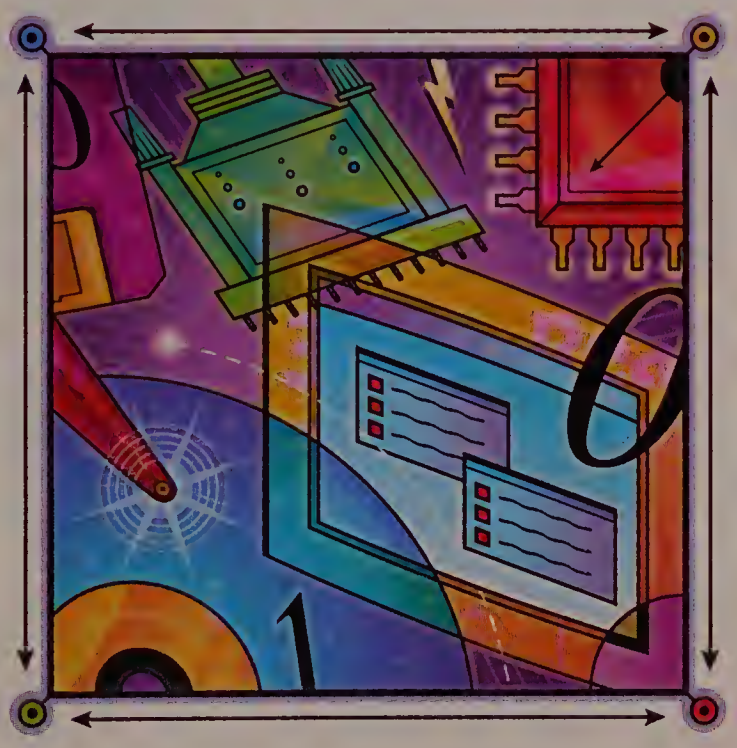
The QuickTime movie controller has several other hidden capabilities. You can select part of a movie by pressing the shift key while dragging or clicking the play bar, and then using the Cut, Copy, or Clear command in the Edit menu. After cutting or copying part of a movie, you can paste it anywhere in the same movie or another movie. To deselect your snippet of movie, ⌘-click anywhere in the gray bar. To play the movie backward, ⌘-click the reverse-step button. Control-click either step button to reveal a slider that controls the direction and playback rate. Option-click a step button to jump to the beginning or end of the movie, as indicated by the direction of the step button. To make your QuickTime movie an optimal size for playback, press the option key while dragging or clicking the size box.

Menu Pictures

Q. How do I take a snapshot of my desktop with a menu still open? I tried pressing ⌘-shift-3, but it won't take a picture until the menu closes.

KEITH CROSBIE
Santa Rosa, California

A. Apple improved the built-in screen-capture capabilities with Mac OS 7.6 and 8.0, but didn't include the ability to capture a menu. You can take a picture of a rectangular region by pressing ⌘-shift-4 and then dragging to select the region. You can take a picture of a window in the active application by pressing the caps lock key and ⌘-shift-4, then clicking the window. To place the picture on the Clipboard instead of in a SimpleText picture file, add the control key to either of those key combinations (or to ⌘-shift-3 for a full-screen picture). Alternatively,



after pressing ⌘-shift-4 you can press the control key while dragging or clicking. To cancel a ⌘-shift-4 combination, press any key.

To capture a menu, you need a screen-capture utility such as the $25 shareware Screen Catcher from St. Clair Software (*www.stclairsw.com*), the $20 shareware Snapz Pro from Ambrosia Software (716/325-1910, *www.ambrosiasw.com*), or the $49.95 program ScreenShot 2.5.3 from the Beale Street Group (901/751-9333, *www.beale.com*). All these programs can take a picture of the whole screen or a region you select, including a menu. They also have other capabilities.

ScreenShot is best for capturing multiple windows (including dialog boxes and palettes) and the menu bar, by itself or in combination with drop-down menus and dialog boxes. For instance, ScreenShot can capture just a Mac OS 8 window and its contextual menu or a dialog box and a pop-up menu that extends outside it. If you don't need to take cropped pictures of multiple objects, the other products are better buys. Snapz Pro can easily take a cropped picture of a menu or one window. Screen Catcher can take a cropped picture of the frontmost window or an uncropped picture of a menu, and it gives you far more options than the others to change color palettes and file formats, including transparent or interlaced GIF or progressive JPEG with a standard Web color palette.

Less Cache Cleanup

Q. When I am on the Internet for a long period of time, eventually a message in the lower left corner of the Netscape Navigator 3.0 browser window says "Cache cleanup: removing *XX* files," where *XX* may be between 30 and 80. How do I avoid that message or reduce the number of files? A Web page takes so much longer to load when a cache cleanup interrupts.

ERIC LAMB
Whitefish, Montana

A. Experiment with Navigator's memory size and disk cache size. If you

continues

increase its memory size (with the Finder's Get Info command), Navigator relies less on its disk cache. If you reduce the disk cache size (with the Cache panel of Navigator's Network Preferences menu selection), Navigator tends to clean up fewer files at a time. Theoretically you could set the cache size to zero and Navigator would never have any files to clean up. However, the smaller the disk cache, the more often Navigator has to reload from the Internet, and that takes longer than cache cleanup. Setting Navigator's cache really high (say, 40MB or 50MB) means the browser can retrieve more Web-page elements from its cache instead of reloading them from the Internet and generally lessens the frequency of cache cleanup, but makes it take longer when it does happen.

Your Web-browsing habits affect how beneficial the cache is and how often Navigator cleans it up. If you hit a lot of new pages all the time, there's going to be a high turnover in the cache and you'd probably be happier with a smaller cache. If you mostly view the same pages and they don't change much, the cache turnover will be lower and a larger cache would likely benefit you.

Cache cleanup and all other cache operations speed up if you locate the cache on a RAM disk (see *Quick Tips*, April and July 1997, for tips on using a RAM disk for browser cache).

Get System Info

Q. I have installed a 256K Level 2 cache on my Performa 6360, but I don't know whether it is working. Is there any way I can find out?

IZZY VASQUEZ
Albany, California

A. Run the free program Cache-22, which is part of the Gauge series from Newer Technology (316/943-0222, *www.newertech.com*). The program reports which CPU your computer has, how much Level 1 cache is inside the CPU, and how much Level 2 cache is installed outside the CPU. Other Gauge programs tell you the clock rate at which the CPU is running, perform a quick test of your computer's RAM, and more (see "Show Me the Cache"). Other good sources of system information include TechTool from MicroMat (707/837-8012, *www.micromat.com*) and Apple System Profiler. Profiler is part of a standard installation of Mac OS 7.6 and 8.0, and is in the CD Extras folder of the System 7.5.3 installation CD. An older version is available separately from Apple's software library (*www.info.apple.com*), but this version works only with Mac models made in the last couple of years.

Replicate Field Format

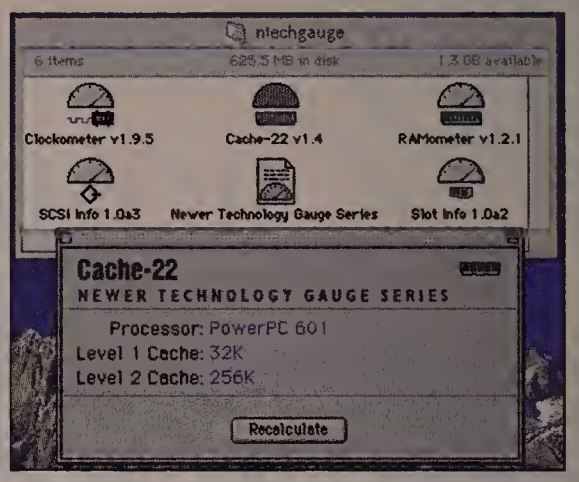
TIP When you add fields to a Claris FileMaker Pro layout, it can be a hassle to respecify all the format attributes for each field—color, font, font size, date or number, and so on. By chance I discovered a way to automatically apply an existing field's format to a field you add. You press the ⌘ key while selecting the field whose format you want to copy, then drag a field from the field tool to the layout. The added field adopts most of the attributes of the field you ⌘-clicked. The formats not adopted include the size, field style (such as pop-up menu), and button attributes. This has saved me a lot of time.

JOHN PROKOS
Portland, Oregon

Audio CD Alert Sound

TIP For those who are a bit tired of the standard system alert sounds or who just love music, here's a way to record a new alert sound from an audio CD using the AppleCD Audio Player program and the Sound control panel. First you watch the AppleCD Audio Player while listening to the passage you want to record and note the track and time where the passage starts. Then use the Audio Player's controls to pause the CD a few seconds before the start of the passage. Make sure the Audio Player's volume control is all the way up. Next open the Sound control panel and display its Alert Sounds settings. If you're not familiar with the controls for recording a new alert sound, click the Add button to see them, and then click Cancel to put them away for now. Switch back to the Audio Player, start the CD playing, and without hesitating switch back to the Sound control panel and click the Add button. Click the Record button a split second before the beginning of the passage you want to record, and click the Stop button when you want it to end (a second or two for an alert sound). Finally, save the sound with a name you want.

FELIX BECCAR VARELA
Buenos Aires, Argentina



Show Me the Cache Download Newer Technology's free Gauge suite and check up on your Mac's Level 1 and Level 2 cache. Other components of Gauge monitor internal slots, RAM, SCSI buses, and bus speed.

If your Control Panels folder doesn't contain a Sound control panel, see if you have a Monitors & Sound control panel with an Add button in the Alerts settings. (Newer versions of Monitors & Sound have the Add button.) If not, look for the Sound control panel in the Apple Extras folder on your start-up disk or use the SimpleSound program.

Before you can record from an audio CD, you may have to set the computer's sound-input source. If you use the Sound In section of the Sound control panel, click the Options button to bring up the Input Source dialog box, and there select Internal CD and turn on Playthrough. If you use the Sound section of the Monitors & Sound control panel, set Sound Input to Internal CD and turn on Listen.

Some older Macs can't record directly from an audio CD in the internal CD-ROM drive if anything is plugged into the sound-input (microphone) port. Affected models include the Quadra and Centris 610 and 650, Quadra 800, Mac IIvx and IIvi, and Performa 600CD.

For more control over recording short segments from an audio CD, use the freeware utility GrabAudio by Theo Vosse.—L.P.

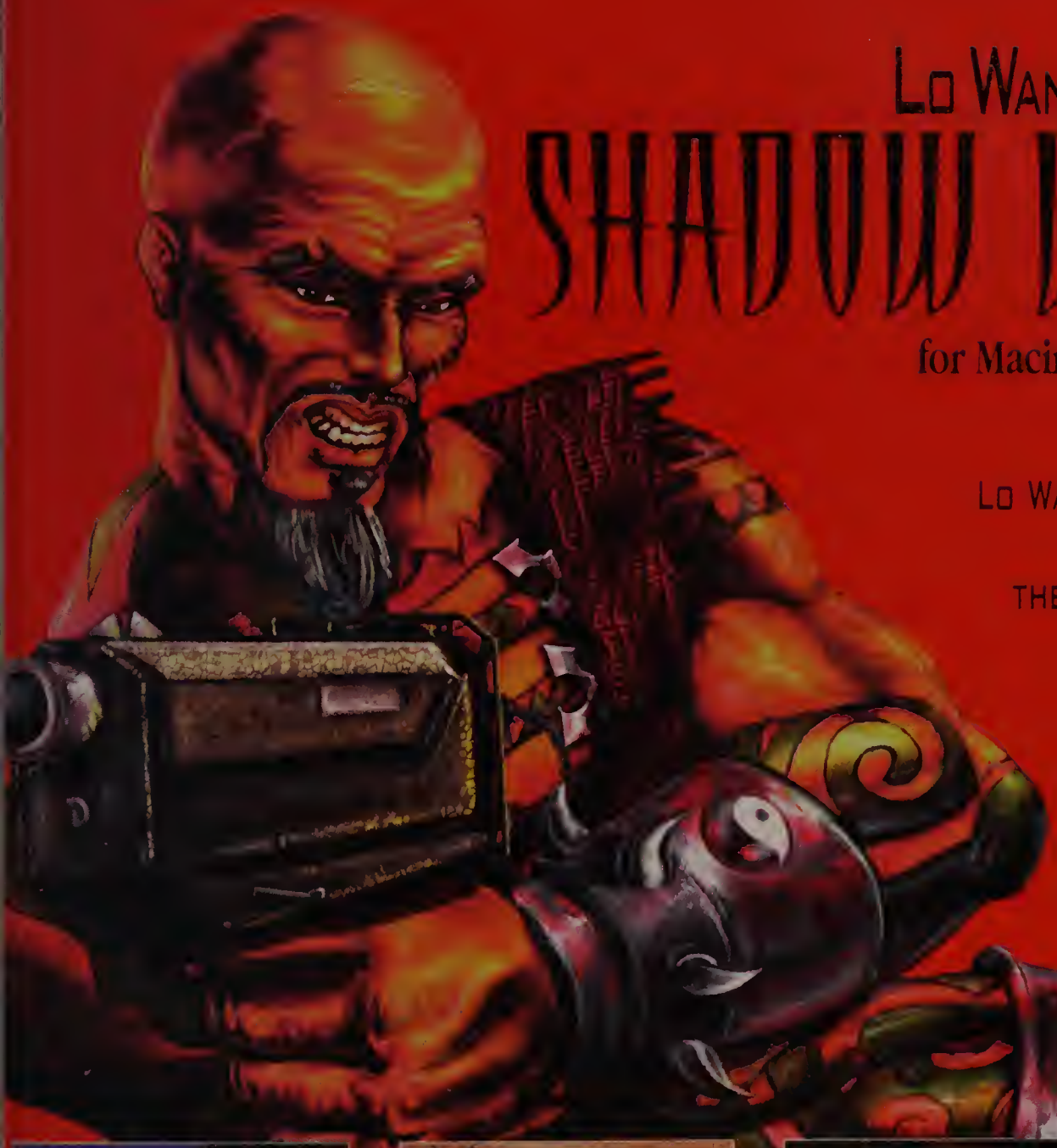
Put Away after Quitting

TIP If you use Aladdin Systems' ShrinkWrap to create a RAM disk for a Web-browser cache (as described in April's and July's *Quick Tips*), there is a way to seamlessly integrate an

continues

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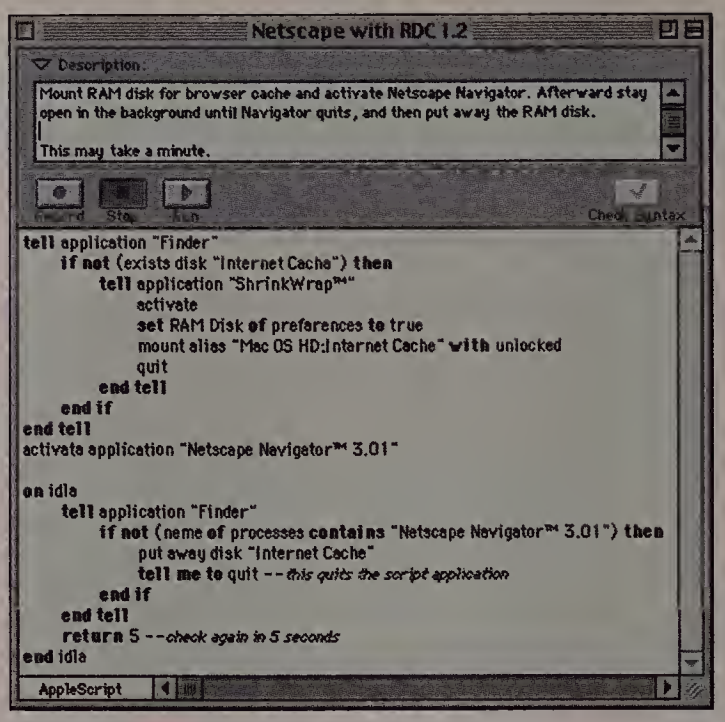
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Extending a Quit Command This stay-open AppleScript application checks every five seconds to see if you have quit Netscape Navigator. When you do, the handler puts away the RAM disk that was used for the browser cache and quits itself.

AppleScript script that automatically puts away the RAM disk when you quit the browser. Bruce Sheplan of Ponce, Puerto Rico, suggests you modify the AppleScript application that mounts the RAM disk and launches the browser. You add some script commands, known as an idle handler, that periodically check to see if the browser is still open and put away the RAM disk if it's not, as shown in "Extending a Quit Command." To make the AppleScript application stay open in the background so it can monitor Netscape Navigator's status, you must turn on the Stay Open option when you save it.

You could also include a command that disconnects your PPP connection after you quit Navigator. For example, inserting the command **PPP disconnect** before the **put away** command would disconnect an Open Transport PPP connection before putting away the RAM disk. If you use the Control PPP for AppleScript control of FreePPP or MacPPP, the disconnect command is **ClosePPP**.

Start-up Chime Revisited

TIP A number of readers have contributed more ideas for turning down or silencing the start-up chime. Instead of plugging in headphones or an earphone as suggested in August's *Quick Tips*, Jeffrey Lomicka of Maynard, Massachusetts, plugs in a ⅛-inch flathead nylon screw. He cut it to ⅝ inches in length and tied a string to the head to make it easy to remove. The screw is less bulky and quieter than headphones, and the flat head allows you to close the port cover on a PowerBook that has one. Be sure to use a nylon screw, not metal, so that you don't create a short circuit!

On a desktop computer with speakers in the monitor, David Mayfield of Anaheim, California, simply turns on the monitor a few seconds after starting up the computer. That happens automatically with an AppleVision 1710AV monitor, since the monitor and its speakers don't turn on until the computer's ADB port comes to life, which happens after the start-up chime. Rick Casey of New York notes that if your monitor doesn't have built-in speakers, a pair of decent computer speakers, available for as little as $50, will almost totally mute the start-up sound when turned off.

If you prefer a more automated approach, Addison A. Edwards of Alairac, France, suggests you create a couple of simple AppleScripts to turn down the sound level during shutdown and turn it back up during start-up. To turn down the sound, enter this one AppleScript statement in a new Script Editor document and save it in the Shutdown Items folder: **set volume 0.**

To turn up the sound, change the number in this statement to any value between 1 (lowest) and 7 (highest) and use the Save As command to save the modified script as an application in the Startup Items folder. You save a script as an application by choosing Application from the pop-up menu in the Script Editor's Save dialog box. For these scripts you should also turn on the option in that dialog box labeled Never Show Startup Screen; otherwise a dialog box will appear every time the script application runs.

Keep Netscape Offline

TIP Several readers contributed more ideas for keeping Netscape Navigator open but offline. In addition to using Navigator's General Preferences to

continues

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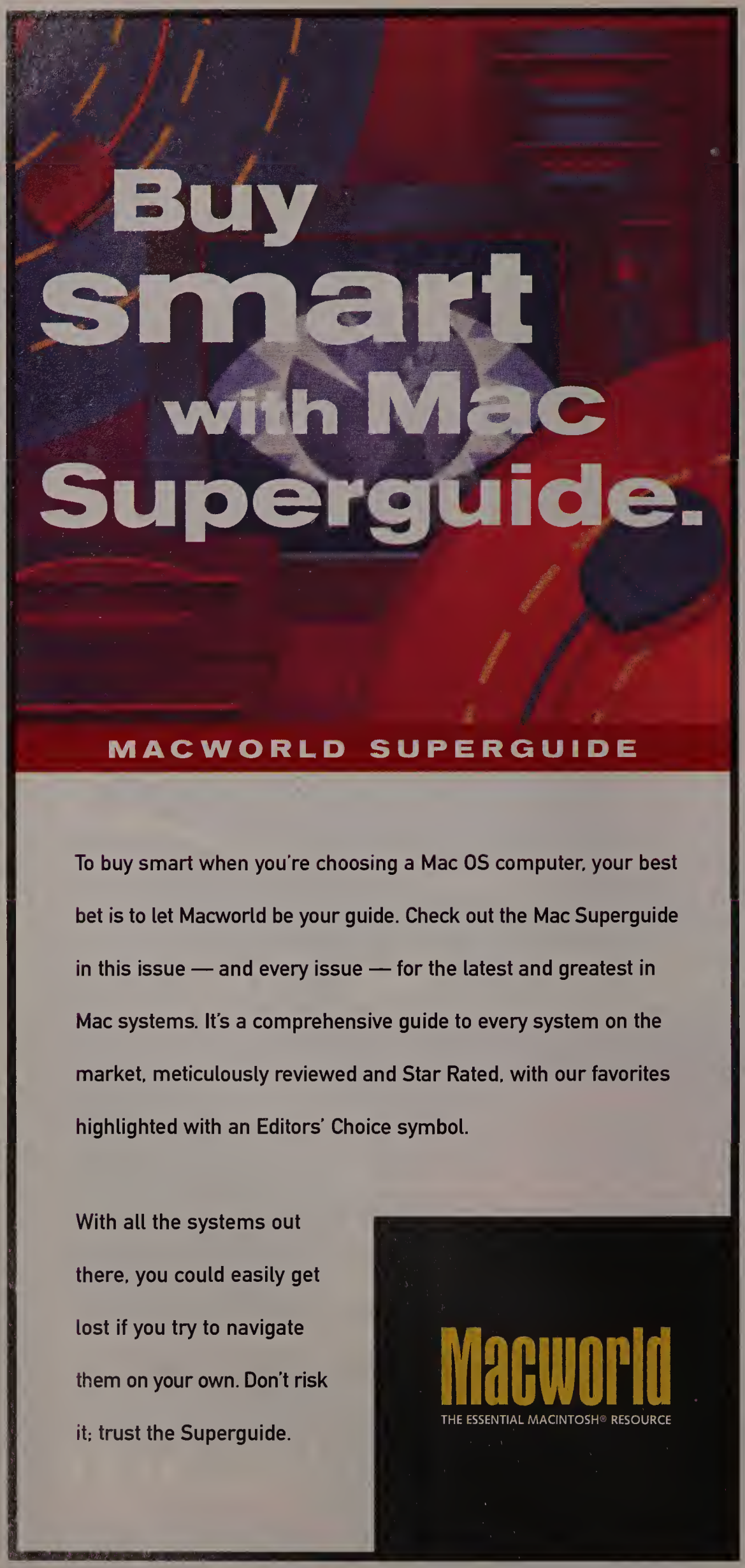
System Requirements: Macintosh with a 68040 or higher microprocessor, 8MB RAM, color monitor and CD-ROM drive. Also accelerated for Power Macintosh.

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set the Browser Starts With option to Blank Page, as suggested in September's *Quick Tips*, Marvis Collett of Salt Lake City, Utah, points out that you must not have the browser set to periodically check for e-mail. To disable automatic checking, choose Mail and News Preferences, and in the dialog box click the Servers tab and set the Check For Mail Every option to Never.

If you want to use a browser to preview a Web page without connecting to the Internet, Fred Sandsmark of Rocklin, California, suggests you simply drag the Web-page icon and drop it on an alias of the browser. He keeps aliases of several browsers on his desktop for this purpose. You could also put the aliases in the Launcher or in a Mac OS 8 pop-up window.

Desktop Folder Alias

TIP If you want to put an alias of the normally invisible Desktop Folder in your Apple menu so you can open items on the desktop from any application, but you can't make the alias from another network computer as suggested in September's *Quick Tips*, Robert DeVoe of Bloomington, Indiana, reminded me you can use the trusty utility program DiskTop from Prairie Group (515/225-3720, *www.prgrsoft.com*) to see and make an alias of the Desktop Folder. If you don't mind adding a system extension, Jason Mannell of Boulder, Colorado, points out that Now Menus does a pretty good job of exposing the Desktop Folder. The shareware control panel MenuChoice by Kerry Clendinning can also give you access to the Desktop Folder from the Apple menu, notes Dean Balmer of Albuquerque, New Mexico. m

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LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld Mac OS 8 Bible* (IDG Books Worldwide, 1997).

Shareware mentioned in *Quick Tips* is available from Macworld Online (*www.macworld.com*) or America Online (keyword *Macworld*).

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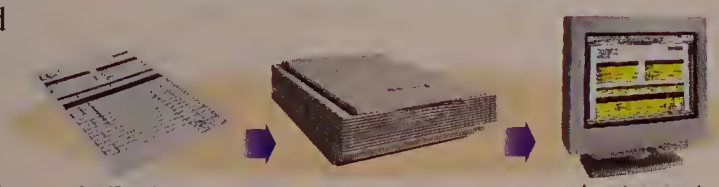
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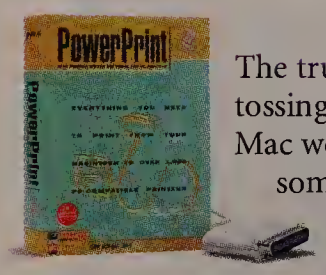
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Adobe Premiere Secrets

TIPS AND TRICKS FOR THE MAC'S MOST POPULAR VIDEO EDITOR

by Jim Heid



Chances are, if you edit digital video on the Macintosh, you use Adobe Premiere. Some high-end video boards include their own editing software, but nearly all entry-level and midrange boards include Premiere (or Premiere LE). While it lacks the ultraprecise motion-effects features of its senior sibling, Adobe After Effects, Premiere can handle simple clip layering and animation (for more on After Effects, see *Media*, May 1997).

This month, let's head into the cutting room for a collection of tips and insights on the Mac's most popular video editor. For examples and more information, visit *www.heidsite.com*.

Capture Tips

Before you can edit video, you have to digitize it. Premiere's Movie Capture command works with any QuickTime-compatible digitizer to enable you to capture video. Here are some tips for successful captures.

Optimize, Then Digitize To get smooth captures, follow the usual rules for capturing video: Enable only essential extensions; these include QuickTime itself and any extensions your capture hardware requires. Turn off AppleTalk and file sharing. Quit all other programs. Capture to your fastest hard drive (be sure to defragment it before your capture session). Use the compression setting your capture hardware's manufacturer recommends. (For details on optimizing compression with the Power Mac 8500, see *Media*, November 1996. All of that column's information also applies to the newer Power Mac 8600.)

Here are two subtle optimization tips direct from Adobe's tech-support gurus. First, to reduce the chance of dropped frames during capture, choose LocalTalk instead of Ethernet in the AppleTalk control panel (yes, even though you've disabled AppleTalk). Second, insert media in all removable-media drives: put a floppy in the floppy drive, a CD in the CD-ROM drive, and so on. This lets your system's CPU concentrate on capturing rather than periodically checking to see if you've inserted something.

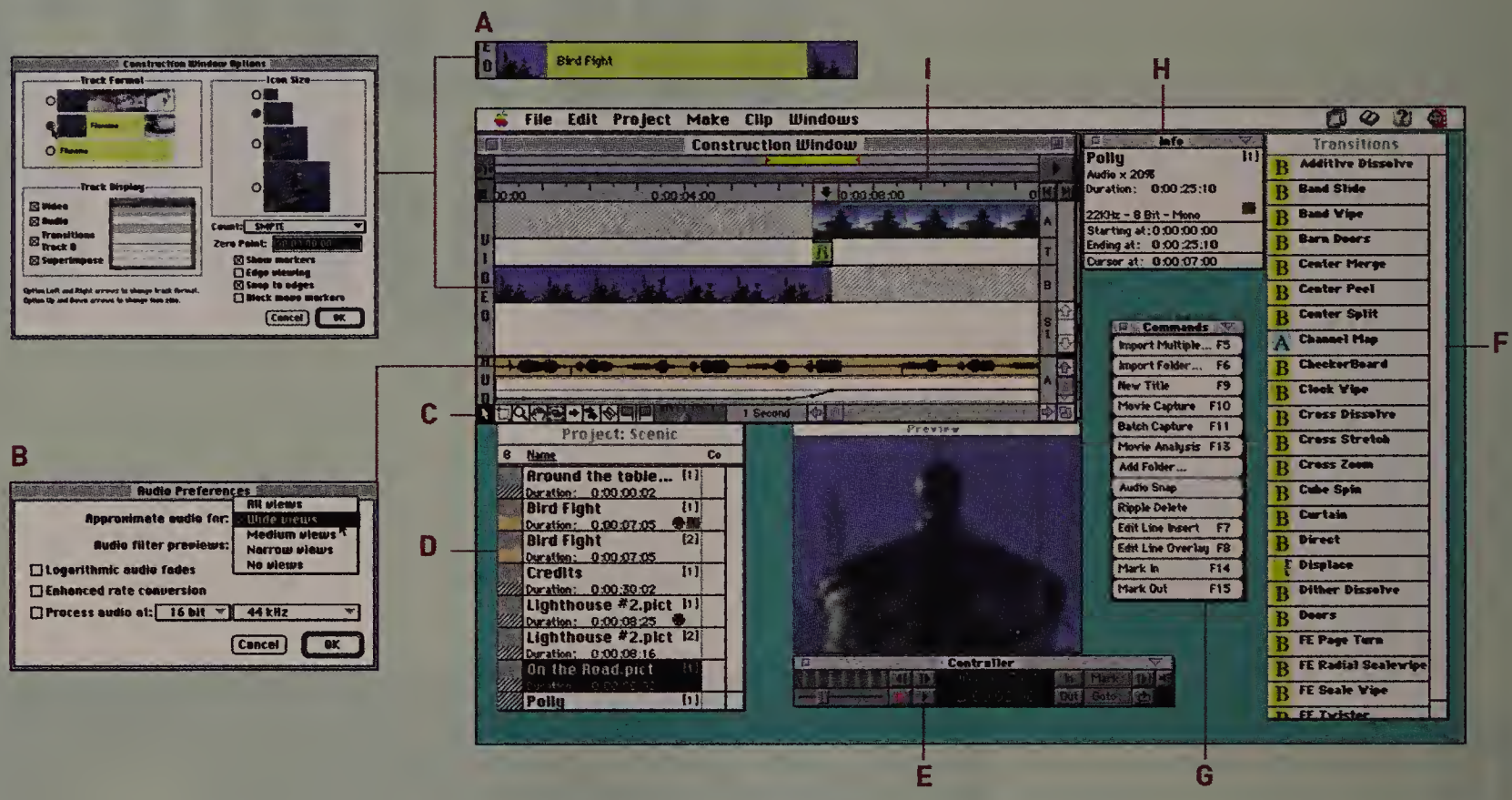
Sync or Sink If you notice audio-video synchronization drifting during lengthy captures, visit Adobe's Web site (*www.adobe.com*) and download version 4.2.2 of Movie Capture Module, which fixes some sync problems. You can also

continues

Fine-tune to Work Faster in Premiere

Fine-tuning Adobe Premiere's window and preferences settings can improve performance and efficiency. You can customize most windows; here's how. With the desired window active, pull down the Windows menu; the relevant Options command appears. (You can also open the Options window directly by just pressing ⌘-1.)

You can save any arrangement of Premiere's windows and apply it to other projects. Choose Layouts from the Windows menu's Arrange submenu, then click on the Save button.



A. For faster scrolling and redraw don't display continuous thumbnails in the Construction Window. Choose the middle or bottom Track Format options.

B. Displaying small audio waveforms can slow Premiere. If you don't always need to see the waveforms, choose Audio from the File menu's Preferences submenu and choose an option from the Approximate Audio For pop-up. If you never want to see waveforms, choose All Views.

C. You can activate each tool in the Construction Window by pressing its corresponding hot key. Most are mnemonic; for example, to activate the zoom tool, press Z. Premiere's documentation and quick-reference card offer a full list.

D. Normally, Premiere displays small thumbnail icons here. That takes time. If you don't need thumbnails, uncheck the Show Icons box in the Project Window Options dialog box.

E. To view a compiled preview (which shows transitions and filters), press the enter key. You can view an uncompiled preview (which doesn't show them) by clicking on the Play button in the Controller bar.

F. If you don't need to see long descriptions of each transition, uncheck the Show Descriptions box in the Transition Window Options dialog box. As shown here, Premiere then shows only transition names, enabling more transitions to fit in the window. Notice that you can create and switch between sets of transitions in Transition Window Options. If you use only a few transitions, create a set containing them. Navigating the Transition window will be much easier.

Two more tips: To jump to a specific transition in the Transition window, type the first few characters of its name. Since the transitions are listed alphabetically, you can rename them to change the order in which they appear (transition files live in the plug-ins folder, within the Premiere folder).

G. Add frequently used commands to the Commands palette and assign function-key shortcuts to them. To customize the Commands palette, choose Options from its pop-up menu.

H. Use the Info window to set accurate audio levels.

I. To preview a specific spot in a project, click on that location in the time ruler. If you click and then drag back and forth, Premiere creates an on-the-fly preview. This can be sluggish on slower systems or with large frame sizes—another good reason to use miniatures.

download this plug-in from Adobe's customer-service areas on America Online (keyword *Adobe*) and CompuServe (*go adobeapp*). Note that the 4.2.2 plug-in doesn't work with Premiere LE.

If your system is just too slow to capture audio and video simultaneously without losing sync, try capturing them separately. When capturing video, turn off audio capture by choosing Sound Off from the Movie Capture menu. Then go back and use the Audio Capture command to record the audio. Sync the two in Premiere's Construction Window. (Preproduction tip: It's easier to sync audio and video when your shots contain a clap. When videotaping people, ask someone in the shot to clap his or her hands once at the beginning of each scene. If you want to play Steven Spielberg, you can buy a Hollywood-style clapper for $24.99 from Markertek Video Supply, 914/246-3036, *www.markertek.com*.)

Performance Tips

Certain aspects of the digital video production process—particularly compressing clips and rendering transitions—can bring a computer to its knees. Try these

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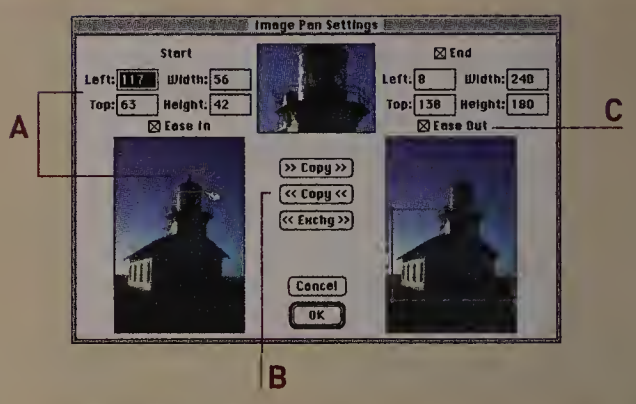
This example of an Image Pan application begins with a close-up of the lighthouse lamp, then pulls back to reveal the lower portion of the building. The cropping rectangle in the Start and End images shows how much of the image will be visible at the start and end of the effect.



A. You can type specific values for the cropping rectangle or drag the rectangle's handles directly. Option-drag to maintain a rectangle's proportions while resizing.

B. Use these buttons to copy the rectangle from one box to another or to swap the two boxes' rectangles. Copying rectangles makes it easy to ensure that starting and ending shots have the same proportion, even if the size of the crop changes.

C. Checking the Ease In and Ease Out options causes the pan effect to begin and end gradually, creating a smoother, less artificial appearance.



tips to keep your machine on its feet.

Performance-Tune the Construction Window Premiere's Construction Window normally displays a series of thumbnail frames from each clip. This provides a nice visual overview of a project but can dramatically slow your Mac each time you scroll or move the Construction Window or change its time scale. The solution: fine-tune the Construction Window.

Use Uncompiled Previews When you want to preview part or all of a project, Premiere must *compile* the preview: crunch through each frame, rendering any transitions and effects. If you just need a rough preview—say, to check the overall pacing of a segment or to audition audio tracks—do an uncompiled preview (click on the Play button in the Construction Window or the Controller). To remind you that you aren't looking at a fully faithful preview, Premiere displays a red *X* in the Preview window during transitions and effects.

Make Miniatures If you're working with full-screen (640-by-480-pixel) movies, compiling transitions and processing filters can be agonizingly slow. Premiere's Miniatures tool speeds things up by creating small versions of the movies in a project. Choose Miniatures from the File menu's Tools submenu, then locate the folder containing your clips. You can change the size and compression settings for the miniatures, but Premiere's defaults—15 frames per second, 160 by 120 pixels—work well. After you click on the Select button, Premiere creates a new folder and stashes the miniatures within it.

Import and use these miniatures as you edit your project. When you're ready to compile the final movie, choose Save and then choose Re-Find Files from the Project menu. In the subsequent dialog box tell Premiere where the originals are. Premiere swaps the big clips for the little ones, and you're ready to go.

Cooking with Pans

Premiere has dozens of special-effects filters, and you can expand its repertoire with third-party plug-ins (see "Video Tools' Top Stars," May 1996).

Some Premiere filters are gimmicky—after all, how often can you use Camcorder, which simulates looking through a viewfinder? But one filter, Image Pan, has very practical applications: it lets you create a pan across a still image whose dimensions are larger than your movie's final frame size. Here are two ways you might use it.

Add Motion to Still Photos Say you're producing a documentary containing a collection of historic photos. Rather than just switching, slide-show style, from one static photo to another, use Image Pan to create slow pans across each photo. By adjusting the filter's crop rectangle, you can also create zoom effects—for example, starting with a close-up of a portion of the still image and then pulling back to reveal the entire image (see "Panning and Zooming").

You can use these techniques to create a dynamic movie even if you don't have any video-digitizing hardware: just use scanned images or even stock photos as your source material.

Create Rolling Credits Want to create classic rolling credits? Use your favorite image editor to create an image whose width matches that of your final movie, and whose height is tall enough to hold the credits. Import that image into Premiere, then use Image Pan to pan vertically from the top of the image to the bottom. If you have Adobe Illustrator, use it to create the credits text. Premiere rasterizes and antialiases the text when you import the file.

Now Premiering on the Web

Every program has to have a Web angle these days, and Premiere is no exception.

Compress for Streaming Video Several plug-ins that compress video for streaming over the Web are available, including one for Progressive Networks' RealVideo. Adobe's Web site contains details and links to the plug-ins.

Make Animated GIFs In June, Adobe shipped an export module that lets you turn a project into an animated GIF file. (For background on animated GIFs, see *Media*, September 1996.) Registered Premiere users can download the export module from Adobe's Web site (you have to enter your serial number before downloading).

Premiere's built-in titling, transitions, and motion-animation features make it a formidable GIF-animation factory—and extend its appeal beyond the traditional video-editing realm. **m**

Next month: Stupid JavaScript tricks

JIM HEID is the author of *HTML & Web Publishing Secrets* (IDG Books Worldwide, 1997).

Unbelievable Ease of use

Don't be concerned about the resolution, size, horizontality and color correction and mode. Just Import images in the Quark image box from a Photo CD disk or from a raw scan. Position them however you want using QuarkXPress's tools. For each, send orders with the processing options to the IPM.

I import my pictures in my QuarkXPress document's image boxes



TIFF, EPS JPEG or Photo CD ImagePac; RGB, YCC, grayscale or CMYK. This image was scanned from a 35 mm original in RGB raw mode at 100% size on a PowerLook 2000 flatbed scanner at its optical resolution of 1000 dpi.

I position them using the XPress tools and I select processing options using the binuscan Xtension

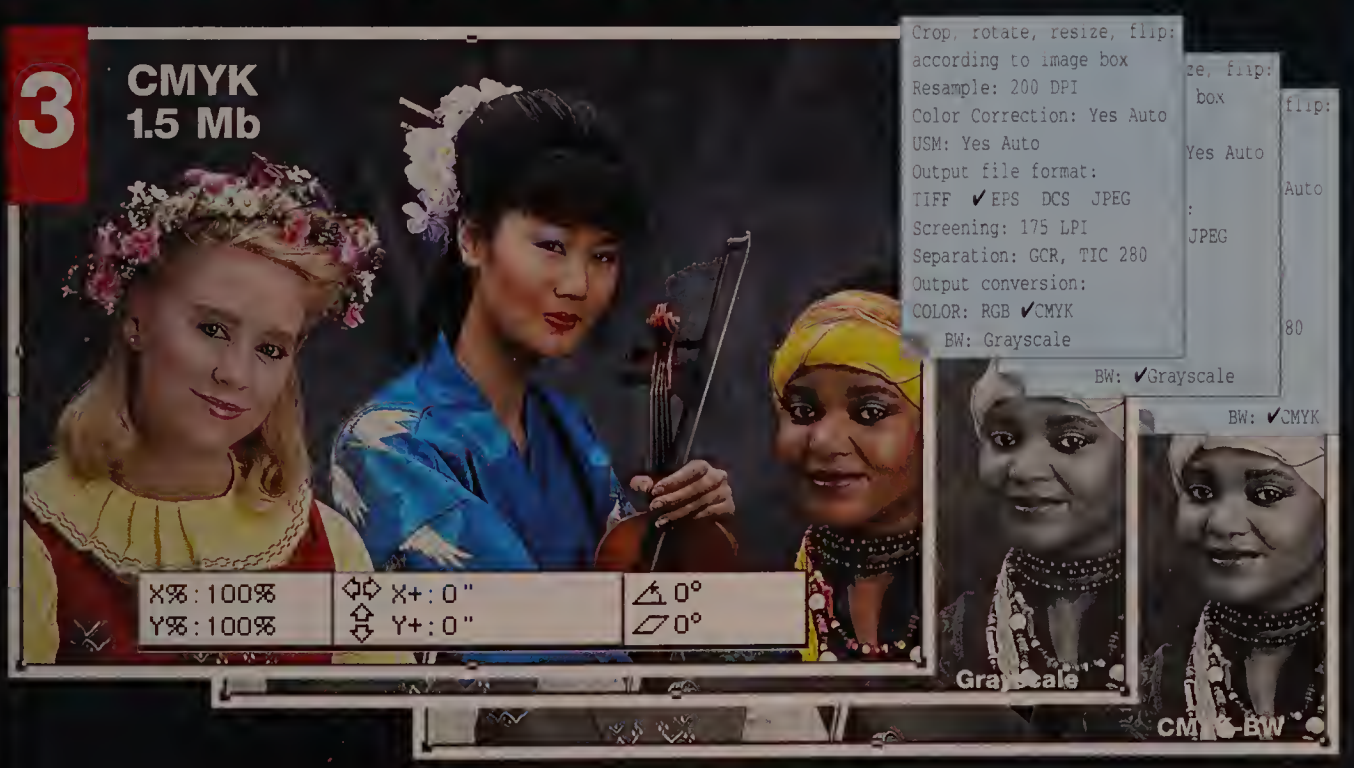


The client XTension writes the "order list" then sends it to the IPM for processing. It includes the values entered in the QuarkXPress "measurement bar" plus the processing and output options set in the XTension's user interface.

Phenomenal Productivity

A catalog with hundreds of images that may require several people a week's worth of work can be processed and ready to output in just a few hours. Processing can take place overnight, even on a low-end desktop computer, with little RAM.

After processing, the new recalculated images are re-imported in the desired color mode with the right amount of pixels... automatically



From a single RGB file, those CMYK, grayscale or CMYK-BW processed images will output at a blazing speed, due to their optimization.

Astonishing Quality

Each processing algorythm uses state-of-the-art technology. Even when the IPM is used only to resize images previously color corrected and separated, the screen preview is recalculated with colors and a sharpness that are truly impressive. No more surprises on the color proof!

See it to believe it !
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for complete digital image management

Mac OS & Windows 3.11, 95 & NT

THE SERVER APPLICATION

"binuscan IPM™" (Image Processing Machine) works in the background, using the processor only when it's free. It recalculates a new image based on the original and a list of orders generated by a client application. This "order list" contains all the user's output preferences, including (but not limited to) CMYK separation specs, automatic color correction instructions, and sharpening levels, as well as any other modifications made to the image (crop, flip, rotate, resize, etc.) by the client application. binuscan achieves an impressive high and consistent quality every time because the IPM bases its processing algorithms on an individual histogram analysis of every image.

THE CLIENT APPLICATION

Many client applications can be used to generate "order list" text files and save them into the IPM's "TO DO" folder for processing. binuscan's open architecture allows third party developers to write custom client applications. The binuscan ColorPro® package includes the binuscan IPM® plus client applications to acquire images from scanners or Photo CDs and binuscan JobManager® (a Quark XTension) which works as described to the left.

THE PERSONAL TOUCH

binuscan ColorCorrect is a utility included with the IPM which allows you to create ghost effects or "sepia effects" and harmonize the images on your page. This utility will perform color adjustments to processed images by writing PostScript functions to the image file. Modifications are written then updated in your page layout in seconds, no matter how large the files are. Every modification can be reverted with the same ease and in the same manner.

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a special version of binuscan
is bundled with all
UMAX
high-end scanners
and is freely available for every
Kodak Pro Master Photo CD

binuscan® PhotoPerfect

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Publishing Workshop

Well-Adjusted Layers in Photoshop

by David Blatner

What you don't know can't hurt you, right? Maybe. Isn't that what they say in scary movies right before the monster makes its first move? Well, when it comes to Adobe Photoshop, it's definitely *false*. Here's a horror story I hear all the time: You have an image that needs a lot of help. First you try tweaking Levels to lighten the image. It's an improvement, but the image still needs help. So you turn to Hue/Saturation to remove a color cast, then Curves to heighten the contrast, then Levels again to make it a little darker, and so on. Eventually you wind up with an image that looks like something the cat dragged in.

What didn't you know? Every time you make an adjustment like this you lose some information; eventually those losses turn into visible damage (for example, the image may start to look grainy and mottled). Perform a number of adjustments, and it's easy to end up with a picture that has good contrast, color, and tone, but lousy content.

Fortunately, Photoshop 4's adjustment layers let you make these kinds of trial-and-error adjustments with minimal penalty because the changes don't actually affect the image until you've finished working on it. You create and edit adjustment layers in the Layers palette just as you would a normal layer. But instead of painting images on an adjustment layer or using it for compositing, you use it to apply a tonal or color correction to the image. If you decide to tweak the image a little (or a lot) more, you can just double-click on the adjustment layer and change its settings.

Stacking Layers

The ability to go back and change the adjustment layer is almost as good as having an unlimited number of undos. But even better is the way you can stack adjustment layers to combine changes. Theoretically, you could use a single Curves adjustment to both lighten a really dark image and take care of a horrible green color cast, but you'd probably drive yourself crazy. Doing the two steps separately is much easier. You just create a second adjustment layer and stack it on top of the first.

Another benefit to adjustment layers is that once you've applied the effect, you can reduce or remove it globally or locally. If you like the Levels adjustment layer you made, but it's harsher than you wanted, you can reduce the intensity by changing the Opacity slider in the Layers palette (or you can double-click on the layer to adjust the Levels sliders).

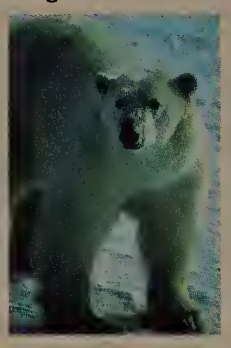
If you want to reduce the intensity of the effect in just one area of the image, you can select the adjustment layer and paint on it. Painting on an adjustment layer automatically paints on the layer's mask: painting with black removes the effect (by masking out the layer), painting over the black with white reapplies the effect; painting with gray partially masks or reapplies the effect.

Layer Adjustment Limits

Adjustment layers cannot perform some important tasks, such as sharpening with the Unsharp Mask filter, and ad-

Step-by-Step Adjustments

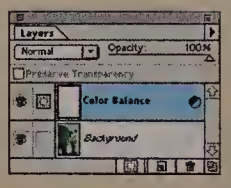
Original



1

This image needs a lot of work. While you could try to fix everything at once through Curves, it's easier to use adjustment layers to make several small corrections.

1. Always fix the biggest problem first. In this case, the image has a horrible color cast.



2

2. I eliminated the cast with a Color Balance adjustment layer.

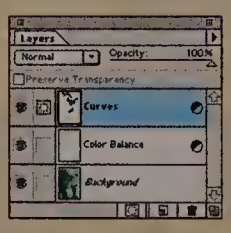
3. The image is still too dark.



3

4. I next added a Curves layer to pump up the brightness and contrast slightly.

5. Some areas became too light, others gained too much contrast. I corrected for this by painting on the layer's mask to reduce the effect locally.



4

Final



5

justment layers (or any layers) can cause trouble because they take up extra space in RAM. But in general, if you use Photoshop 4 and have plenty of RAM, you should make tonal and color corrections with adjustment layers.

When you've got the image the way you want it, save it in the Photoshop file format to keep the adjustment layers intact (you never know when you'll need to make another change). Then, using the Save A Copy command in the File menu, save the image to disk as a TIFF or EPS file. This command lets you flatten the layers and save at the same time. When Photoshop flattens the image, it makes all the adjustments at once, so you don't damage the image any more than you need to. **m**

DAVID BLATNER is coauthor of *Real World Photoshop 4* (Peachpit Press, 1997) and *The Joy of Pi* (Walker and Company, 1997). You can reach him at *david@moo.com*.

Bringing Out Details

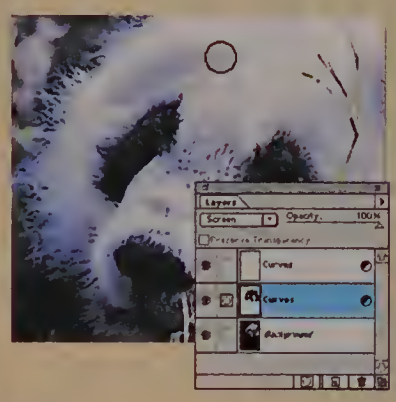
Photographs that are dark or underexposed often appear to have lost detail in their highlights or shadows. You can sometimes draw these details out and get a good-looking image by using "neutral" adjustment layers and setting them to Multiply or Screen mode. To make a neutral layer, create a Levels or Curves adjustment layer but *don't* change the settings in the Levels or Curves dialog box. The image doesn't change until you choose an apply mode.

For overexposed images that are too light, set the apply mode to Multiply. This builds density, darkening the image. For underexposed images that are too dark, set the apply mode to Screen. This reduces density and lightens the image intelligently.

1



2



3



This image is so dark there's no detail in the shadows. Note the panda's eyes—or rather their absence (**1**). The addition of two neutral Curves adjustment layers, both set to Screen mode, makes the image significantly lighter. The panda's head is now too light, so I painted on the adjustment layer's mask to reduce the effect in the brightest white areas (**2**). Details in the eye area now stand out, but details in the white fur remain (**3**).

MAKING ADJUSTMENT LAYERS

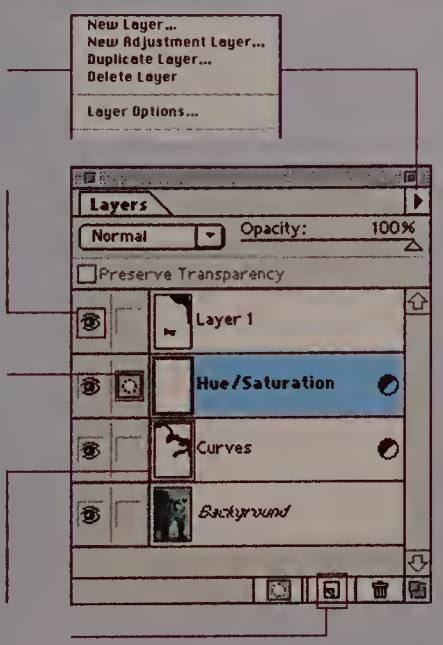
To make an adjustment layer, choose New Adjustment Layer from the New submenu (under Photoshop's Layer menu). Or, faster yet, ⌘-click on the New Layer button in the Layers palette.

Click here to see a variety of layer options, including adjustment layers.

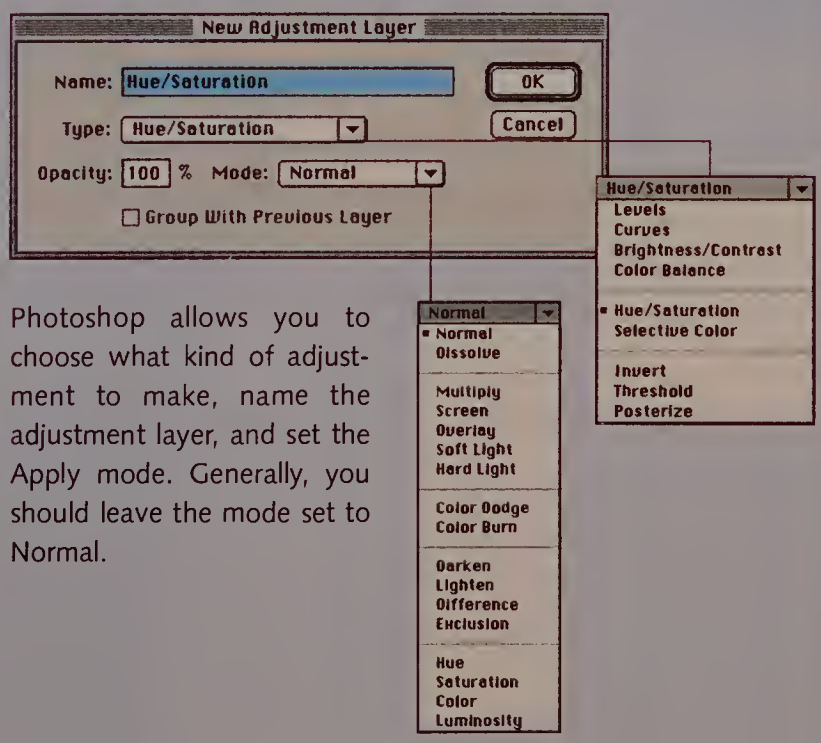
Click here to show or hide a layer (to see "before" and "after" versions).

Painting on an adjustment layer automatically creates a layer mask.

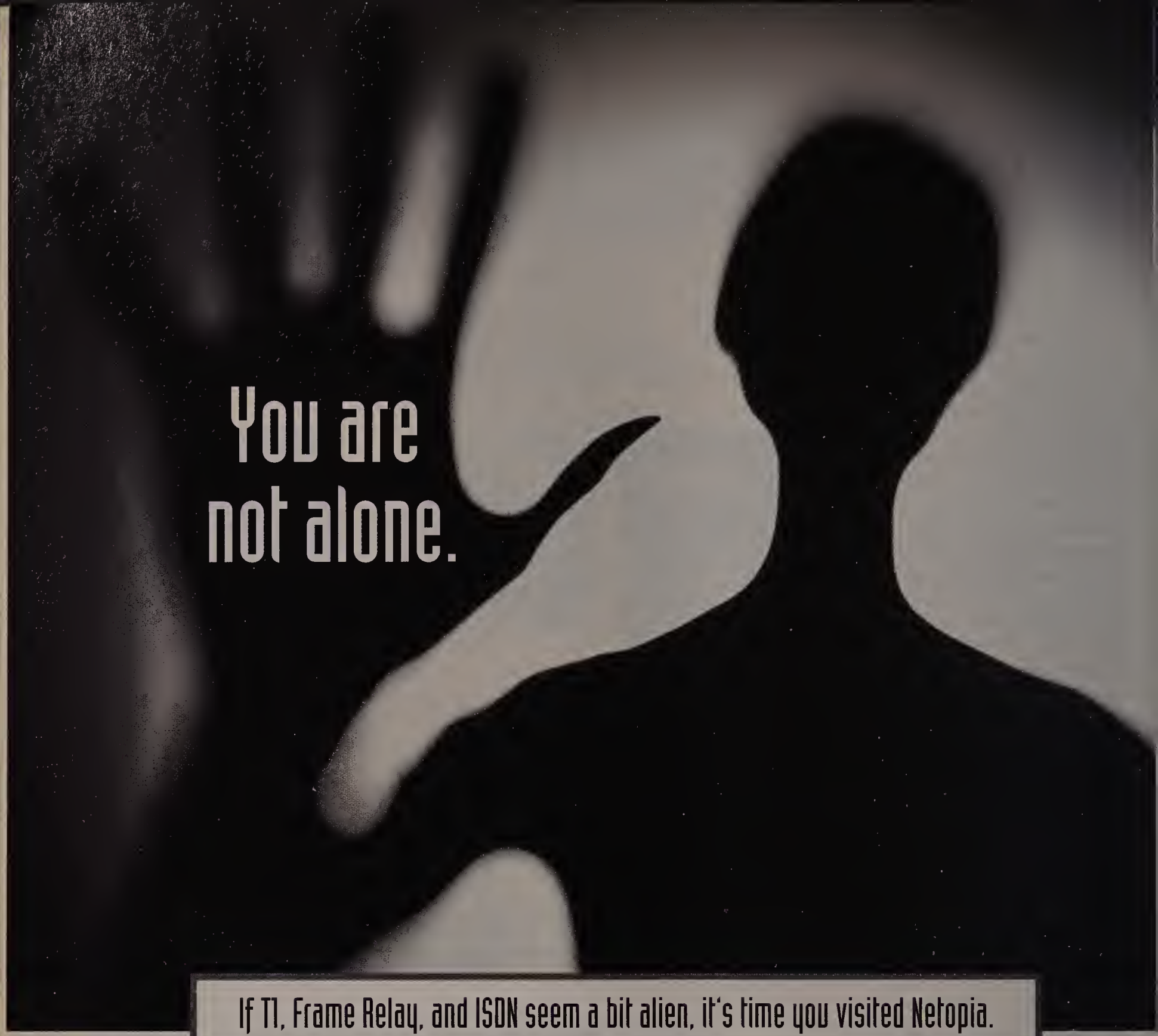
Paint on the adjustment layer's mask appears in this thumbnail.



⌘-click here to make a new adjustment layer.



Photoshop allows you to choose what kind of adjustment to make, name the adjustment layer, and set the Apply mode. Generally, you should leave the mode set to Normal.



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The Copyright Website
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By Ben Long
graphicsuser@macuser.com

Safeguard Your Art

It's 1997. Do you know where your images are?



Illustration: Matt Terry

"Good artists copy. Great artists steal," said Pablo Picasso. Although borrowing ideas and motifs from other works is common practice in any creative endeavor, Picasso probably never imagined a digital realm in which images could easily be copied and moved with no loss of quality.

Now we live in just such a digital world, and one side effect of our Web browsers and low-cost scanners is that copyright infringement has become an issue for artists and publishers of all kinds. It used to be fairly expensive and difficult to scan and descreen an image from a magazine. These days, scanners are cheap and plentiful, and with a few mouse clicks on the World Wide Web, a user can copy images made by people on the other side of the globe.

If you earn your living creating images, take a look at these solutions, both legal and technological, for protecting your intellectual property.

Your Basic Copyright Rights

The good news is that you really don't *have* to do anything to copyright your creative work, be it words or images on paper or on the Web. All these things are automatically copyrighted by U.S. law, simply because you made them. Be aware, however, if you create artwork "for hire" — which usually means while you're at your job — the copyright belongs to your employer.

It's enforcing your copyright that can get tricky, especially on the Web. After all, once your work is on someone else's machine, what's to stop that person from claiming ownership?

Getting the Law on Your Side

One of the first steps you can take to protect your images, then, is to get proof that they're really yours. If you get into a situation where you need to defend your copyright legally, it won't be enough to simply point to a copyright symbol on your Web page. You will need to have registered the images with the U.S. Copyright Office and made your rights a matter of public record. Registration is a requirement before you can file a copyright-infringement suit in court.

You can get detailed information about registration, as well as registration forms in Adobe's PDF format, from the U.S. Copyright Office's Web site. There is a $20 fee for registering. After processing your form, the Copyright Office will send you a certificate of registration. With this in hand, you have immediate proof that your artwork is your own.

Low-Tech Protection

It's nice to have the law behind you, but many of us would rather not ever get to the legal stage. The threat of copyright infringement and the possible legal consequences that may follow are not always enough to keep other people from stealing your images — either intentionally or unwittingly.

The easiest low-tech way to make your images less enticing is to place a visible watermark of some kind, such as a copyright symbol or your name, somewhere *on* the image. A company that does this is Digital Stock (www.digitalstock.com), a stock-photo house that sells royalty-free photos. Digital Stock protects the low-resolution sample images it publishes on the Web and in its CD-ROM catalog by putting a large ghosted copyright symbol

The Cyberspace Law Center
Peruse this comprehensive guide to legal resources for copyright issues at www.cybersquirrel.com/clc/index.html

U.S. Copyright Office
Order copyright-registration forms by phone (202-707-9100), or download them at lcweb.loc.gov/copyright

in the center of each sample image (see Figure 1).

Digital Stock doesn't worry about the high-resolution, suitable-for-printing images on the CD-ROMs it sells. First, the images are royalty-free, so customers who've bought a CD-ROM are free to use the images in most situations. Second, the company assumes that its customers — people who work in high-end professional design houses that would rather not see their profits eaten up in legal hassles — will generally tread carefully around copyright issues anyway.

Using visible, low-tech watermarking and down-sampling images to low resolution (which is inevitable when you place images on the Web) are both good basic methods for deterring users from pirating images and then *printing* them. However, there's nothing to prevent unscrupulous users from cropping or touching out a low-tech watermark so that they can use images in their own Web pages or in other low-resolution media, such as multimedia presentations. For that sort of protection, you need a more robust way to mark an image.



***Figure 1** · Digital Stock, a stock-photography agency, protects sample images such as this on its Web site by putting a ghosted copyright symbol in the image's center. The image also does not have sufficient resolution to print at the highest quality.*

High-Tech Protection

Digital watermarking is a way of encoding copyright and ownership information *within the data* that makes up an image. Ideally, this information is invisible enough that it doesn't degrade the quality of the image and durable enough that it can't be cropped or edited away. Several companies, including Signum Technologies and Digimarc, currently offer digital-watermarking products, and soon there will be even more. Keep an eye out for a new competitor — Signify (an NEC company) — entering the field within the next year.

Signum Technologies and Digimarc offer very similar digital-watermarking systems, but as of now, Digimarc's has the edge. It's the only digital-watermarking product that is integrated into major graphics programs such as Adobe Photoshop (and the Windows standards CorelDRAW and Corel PHOTO-PAINT). Digimarc is also the only company that offers a service to help you find image thieves (as we'll discuss later).

The integration of Digimarc's product with major graphics applications is more than just convenient; it means that the company's digital watermarks can more *actively* protect your images. PictureMarc, the tool for reading and embedding Digimarc watermarks, is built into Photoshop 4.0, so each time someone opens your image, Photoshop automatically checks to see if the image has a Digimarc watermark. If there is a watermark, the person looking at your image will see a small copyright symbol (©) in the title bar. So warned, the viewer can use the Digimarc Reader plug-in (located on the Filter menu) to see what copyright restrictions you've placed on the image, view your creator ID, and even link to the Web to find out how you can be reached.

When you register with Digimarc as an individual, you receive a creator ID, for an annual fee of $100, and the license to watermark an unlimited number of images. Corporate accounts are also available, and the fees vary from $850 to $5,000 a year, depending on the level of software and service the company desires. Digimarc also offers a batch processor for companies that have large numbers of images.

Digimarc's watermarking software adds an encoded pattern to your image — the watermark — which imitates photographic noise. This means that there is little change to image data. (To see what a digital watermark adds to your image, see the second image in the "Steal This Dog" sidebar.) Because your ownership information is encoded in a noise pattern that's spread throughout the image, the watermarks are quite resilient. There's no way to crop the information out. According to Digimarc, the company's digital watermarks survive even if you've cropped an image down to as small as 128 x 128 pixels. In addition, the watermarks can survive resizing, from 60 percent to 200 percent, as well as sharpening, blurring, rotating, and many other filter effects.

Most important, however, Digimarc watermarks can survive halftoning and rescreening. If you unexpectedly see one of your images in a magazine or newspaper, you can simply tear out the image, scan it, and have your reader software check the resulting image file for your watermark. (See the "Steal This Dog" sidebar.)

Digimarc's watermarks are not indestructible. Given the pixel-moving power of image-editing software, it is possible to corrupt the noise-based data in an image. However, by the time someone has done enough to your image to wreck the watermark, the culprit has probably ended up with a derivative image that is beyond your legal claims as the original owner.

Despite the power of Digimarc's software, digital watermarking isn't for everyone. Digital watermarks are well hidden, but the watermarking software *is* making changes to your images. Although you can't tell a PictureMarc-altered image by sight, some people report that they can tell a difference when they juxtapose a watermarked image and an original.

If you've spent a lot of time and effort getting an image just right, handing it over to a program that's going to change it — no matter how imperceptibly — may be a little unnerving. One way to decide if it's worth the effort is to consider the second part of image protection — *finding* the people who've swiped your images.

Stop, Thief!

No matter how much proof you have that you own an image, it won't do you any good if you don't know who's taken it. Since visitors to your Web site don't leave foot- or fingerprints, you're faced with a lot of Web surfing and magazine reading if you want to try to find images that may have strayed from their rightful locations.

Fortunately, Digimarc has addressed part of this problem as well. The recently released MarcSpider is a Web-based agent that prowls the Web searching for PictureMarc-encoded images. (Sorry, no current technology can flip through the pages of printed magazines for you.) Once it has found an image, MarcSpider reads the image's watermark and creates a report that includes a thumbnail of the image, the URL of the site where it was found, the date on which it was found, and the date on which the page was last modified.

MarcSpider service is included with individual users' registration fees and with



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44 (0) 1242 251600 (fax)
www.signumtech.com

Invisible Ink
Signify, Princeton, NJ
609-734-7620

many of the corporate packages. In order to access the report, you simply go to a special section of the Digimarc Web page and enter your creator ID and password. The report is then displayed within your browser.

The rub is that if you routinely sell images, you'll need to be able to differentiate between legal and illegal postings of those images before you plow through a huge MarcSpider report (or else you may accidentally send nasty letters to legitimate clients). Digimarc has recently come up with one solution to this quandary — a batch image processor that can add an additional watermark containing separate ID tags for the creator of an image and the distributor of an image as well as unique transaction numbers. This way, you can tag individual copies of images with unique information to help you determine if the use of that image is legal or not.

The fact is, however, that the utility of MarcSpider depends on your situation. If you've got thousands of images floating around the Web, digging through a huge report of legal and illegal image postings just may not be worth the trouble. On the other hand, if you're creating images that you *know* shouldn't be anywhere else on the Web — such as images for online catalogs, real-estate photos, or custom images and icons — MarcSpider makes it simple to track images that have strayed to other sites.

Steal This Dog

Or, rather, steal this picture. (The actual dog is safe in an undisclosed location in Oakland, California.) Although it looks as vulnerable as the next image, this photo actually contains a Digimarc digital watermark. The watermark, which is encoded with ownership and copyright information, is hidden in the image's noise pattern.

You can see it for yourself if you scan the image into your computer and open it with Photoshop 4.0. Photoshop will automatically detect the watermark and place a copyright symbol (©) in the document's title bar. All you have to do to see who took the photo — and what restrictions, if any, have been placed on reproducing it — is choose Read Watermark from the Filter menu (Filter: Digimarc: Read Watermark). If you have trouble reading the digital watermark after scanning, apply the Blur filter (Filter: Blur: Blur) and try again. If you don't have a scanner, you can also find this image on our Web site.

With a little help from Photoshop, you can go even further behind the scenes to see what a Digimarc watermark adds to your image, as we did with the second image below. To test a watermark of your own creation, open an image in Photoshop and save the file with the name Unmarked. Then embed a generic watermark in the image (Filter: Digimarc: Embed Watermark) and save this altered file with the name Marked.

Open both image files, and place them side by side. Click on the Unmarked image to select it, and choose Calculations (Image: Calculations). In the Calculations dialog box, set Source 1 to Unmarked, Source 2 to Marked, Blending to Difference, and Result to New. When you're done, click on the OK button.

You should see a new window filled with solid black. Choose Levels from the Image menu (Image: Adjust: Levels), and slowly slide the Gamma slider — which is the gray slider in the middle — toward the left. As you do so, the Digimarc noise pattern will begin to appear. You're seeing the difference between the two images, which in this case is the custom noise pattern that the Digimarc plug-in embedded in your image.



This looks like just an ordinary picture of a dog, but actually this image is protected with a digital watermark, an encoded pattern that imitates photographic noise.



A Digimarc digital watermark adds a simple code to your image, distributed throughout the image and disguised as image noise, which you can see here. Because it's in all parts of the picture, it cannot be cropped away.

Calling in the Copyright Cops

If you do find Web sites or printed material containing stolen images, there are several things you can do. In most cases, people who steal images have done so unwittingly. Particularly on the Web, where many people are publishing their work for the first time, users sometimes just don't realize that it's not legal to reuse images taken from another source. In most cases, simply contacting these people and asking them to remove the images is all you have to do.

If someone refuses to remove an image, then it's time to fall back on your digital watermark and copyright registration. Contact the author of the Web page, and tell that person that the image in question includes a digital watermark that proves your ownership and copyright. Most likely this will scare the person into removing the image.

If your adversary remains stubbornly unconvinced and you end up in court, one piece of good news is that if you registered your image with the U.S. Copyright Office before it got stolen (or within three months of its publication), you're entitled to statutory damages and attorney's fees.

Mine, All Mine

The lengths to which you're willing to go in order to keep your images close to home will depend largely on the types and quantity of images you have to protect. Protecting your images from the threats of the modern world can certainly take extra work, but whatever method you use, if any, try to take some time to research your legal rights.

Whether you're trying to safeguard hundreds of images or just a few, careful attention to the details we've outlined here can help you make sure your work doesn't get hijacked (or imagejacked) on the information highway.

Ben Long is a freelance writer and illustrator as well as a MacWEEK *contributing editor.*

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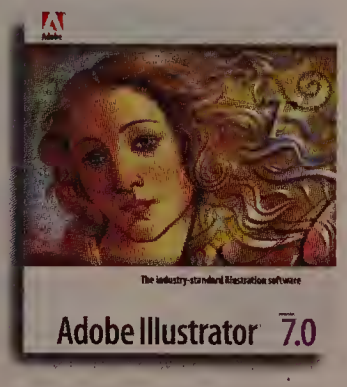
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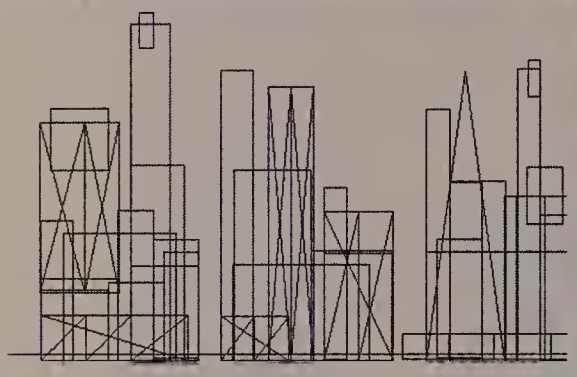
By Janet Ashford
graphicsuser@macuser.com

3-D Tricks for the 2-D Trade

Stick to simple shapes, and you can harness the power of 3-D without all the hassle

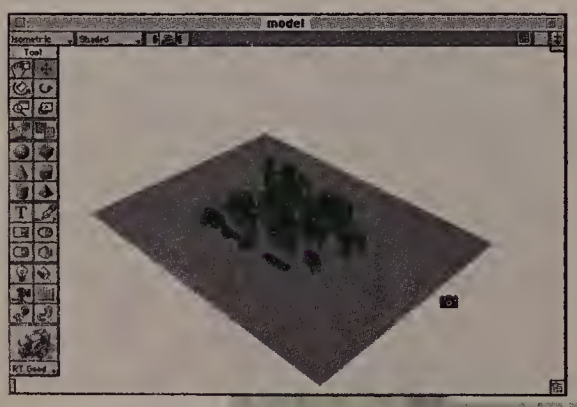
Adding extra dimension to your design takes on a whole new meaning when you start to experiment with 3-D images in your 2-D work. Many artists are intimidated by 3-D applications' lingo and learning curve, which can seem impenetrable if you're used to the limited depth of Adobe Photoshop layers. However, if you stick to ready-made shapes, called *primitives*, and a single texture map, you can successfully tap into the power of 3-D even if you've never dared to before.

Nearly all 3-D programs have tools that quickly create primitive shapes such as cubes, spheres, cylinders, and cones. These basic shapes are provided because they're the building blocks of so many other forms and objects, natural and human-made.



1 Begin to build your model by creating simple shapes.

Most 3-D programs have special tools designed for quickly creating basic 3-D shapes, or primitives. If you click on the Cube tool on the Tool palette, for example, you can drag your cursor to create a cube of any size. Odam wanted tall skyscrapers, not square boxes, so he selected the Object Scale tool, grabbed the top of a cube, and dragged upward to stretch the cube until it became a rectangular box. He then used other primitive tools to create different shapes, including a flat plane (which serves as the ground), a cylinder, and a pyramid.





2 Choose a seamless image to wrap around your shapes.

Once you have your shapes in place, find an image to wrap around them, preferably one designed to repeat seamlessly, much as wrapping paper does. Odam found an image of clover in the Wraptures stock collection. If necessary, convert the image to the PICT file format. To load it into StudioPro, select the Textures tab from the Resource palette (Windows: Show Resource Palette), choose New Surface Texture from the pop-up menu, click on the Map button, choose Load from the Map dialog box, and select your file. It will appear as a highlighted button under the Textures tab. To apply it to the surface of your shapes, select the model (Selection: Select All) and click on Apply under the Textures tab. (Don't be alarmed if little seems to happen — you won't see the finished effect until your model is *rendered*.)



3 Adjust your camera angle, and add lighting effects.

To change your view of the model, create a new *camera*. Select the Camera Object tool from the Tool palette, and then click on your 3-D world. You'll see a small camera with a red wire-frame pyramid jutting from its lens, which indicates what's inside the camera's field of view. Select your Object Move tool, and click and drag the red lines to include or exclude objects. Then open that camera's window (Windows: Camera Windows: Camera-1) to see through its eye. To create a light source, open the Environment palette (Windows: Show Environment Palette) and click on the Lights tab to see a dark circle that represents your 3-D world and a white adjustable globe that represents a light (if there's no globe, click on Add, and one will appear). Odam used a single light source to get the effect of natural sunlight falling on the city.

Macromedia Extreme 3D
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www.macromedia.com

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MetaCreations, Carpinteria, CA
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503-731-0986 (fax)

Primitives usually form the base of more-complex models, but they can also be used on their own. When the right surface texture is applied, a simple primitive shape can look very real. For example, a map of the world applied as a surface map to a sphere can make a globe; a product logo applied to a cylinder can make a realistic-looking can of soda. And when you combine primitives with unusual surface textures, you can also create improbable Dada-like objects such as a fur-lined bowl and spoon.

Come along as we follow designer John Odam's steps for creating a book cover that integrates 3-D art. Odam needed a clever way to illustrate the concept of combining big business with environmental awareness. He used Strata StudioPro to create a basic 3-D model of city buildings. He then wrapped the buildings' shapes with an image of leaves to hammer the metaphor of the book cover home.

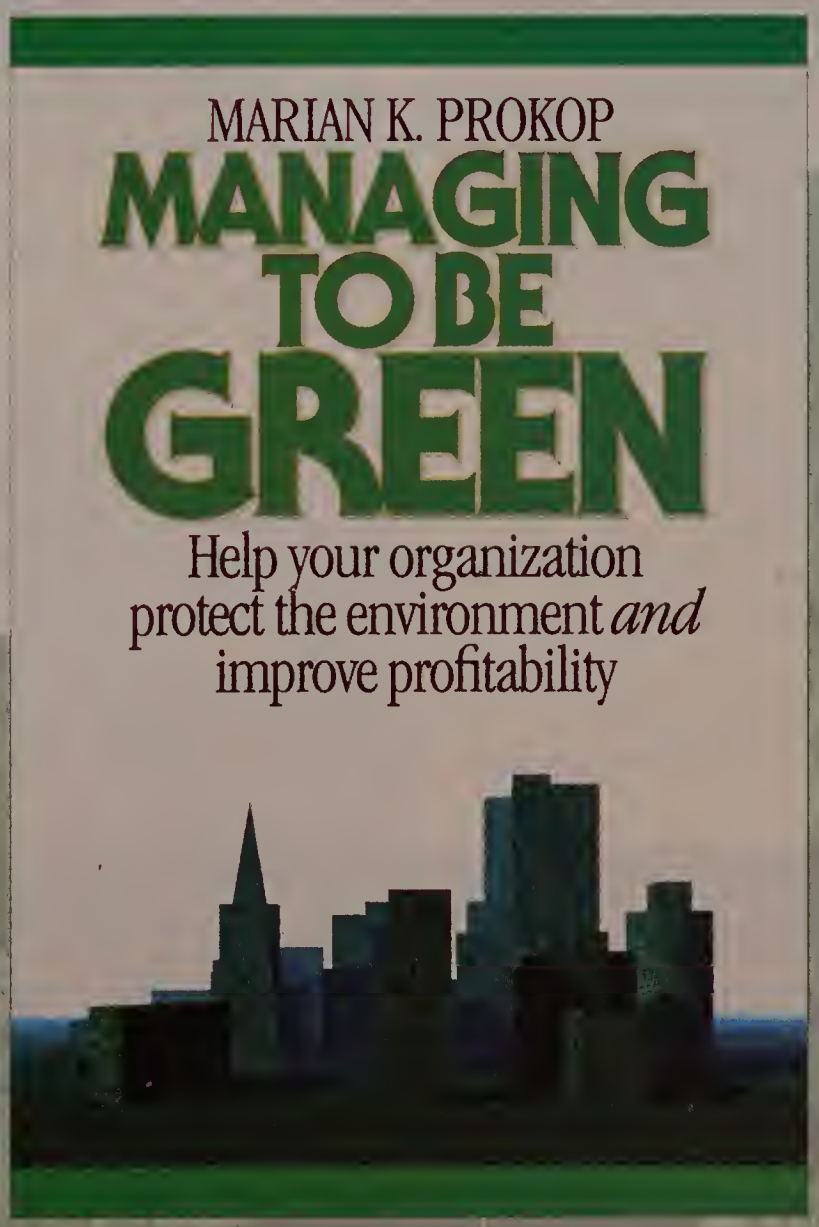
We've used Strata StudioPro 2.0.2 menu commands here, but you can get the same effect in older versions of that program, which you may want to stick with after you read our review of version 2.0.2 ("Pop Art," September '97, page 54). Many other 3-D applications will work as well.

Janet Ashford is the coauthor with John Odam of the forthcoming Start with a Shape: A Designer's Guide to Desktop 3D *(Peachpit Press, 1998). Visit her Web site at www.jashford.com.*



4 Add realism with atmosphere.
Atmospheric effects, such as fog or mist, can provide the visual cues for scale and distance that make a finished model look more realistic. You can use StudioPro's preset effects or customize one of your own. To get a fog effect, click on the Air tab on the Environment palette; choose New Fog from the pop-up menu; and then enter specs for color, distance, and visibility in the Fog dialog box. To get the effect of a blue sky, Odam made the fog blue, since after a certain distance, 3-D fog becomes opaque. The fog will appear as a named icon on the Resource palette. To apply it, drag and drop it onto the model. Check your work by clicking on the big camera at the bottom of the Tool palette. You'll see a fast-rendered version of your scene.

5 Render your model, and composite it with 2-D trappings.
Now it's time to render your model — in other words, apply all your settings. A high-quality renderer is the best choice when you plan to print your results. Open the Render dialog box (Rendering: Render), and choose the best-quality Raytracing (Settings: Raytracing: RT Best). Then choose Fine and Extra Smooth from the Texture Detail and Image Quality pop-up menus, respectively. Using the size fields, specify the size you want your final image to be, and then click on Render. Save the finished image as a TIFF file. Odam opened his cityscape in Photoshop, used the Magic Wand tool to select the blue background, and deleted it. He then used the Marquee tool to select the two areas where the horizon meets the white background and applied a vertical motion blur (Filter: Blur: Motion Blur) to soften the edges and maintain the fog effect. He saved the finished image, imported it into Adobe PageMaker, and combined it with type and borders.



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By Shelly Brisbin
netuser@macuser.com

Open for Web Business

Three ways your small business can make its grand entrance onto the Internet.

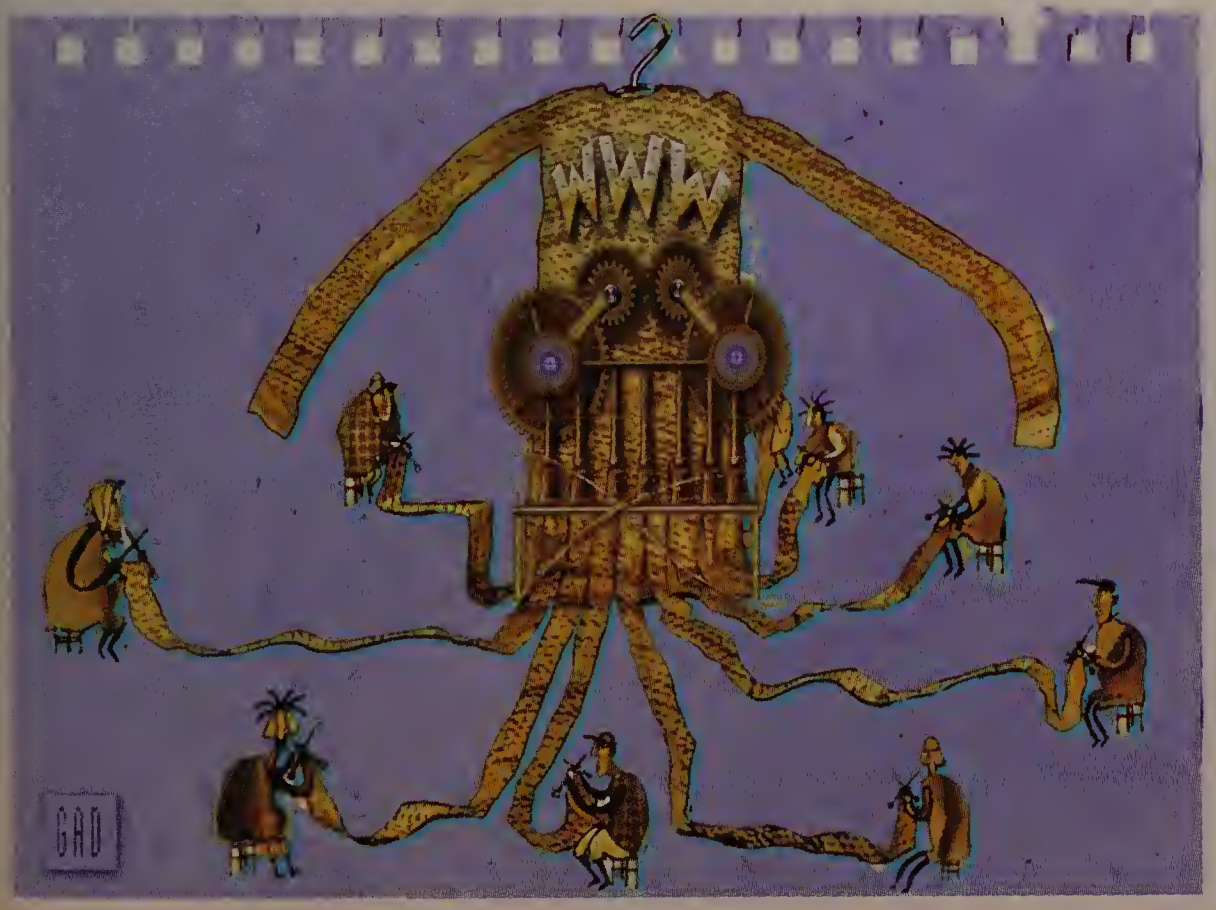


Illustration · Victor GAD

An Internet connection is crucial for small businesses today. But before you spend a dime on another modem, let us help you decide what type of connection and services make sense for your business.

Bare-Bones Business Access

In a small office that has only a few potential Internet users, the quickest and least-expensive way to get your business online is the same method most individuals use: get a modem ($100 to $200 on average) and an account with an ISP. This method works well if most of your office's Internet activity consists of sending and receiving e-mail and browsing the Web. Most ISPs will sell you a single dial-up account (for billing purposes) with multiple mailboxes for e-mail (one for each person in your office). Extra mailboxes are often as little as $5 apiece or free with a basic business account. Of course, you'll still need a modem for each user.

If you want to extend your business onto the Internet, consider getting your company its own *domain name.* To do so, have your ISP request a name like yourcompany.com from the InterNIC (the Internetwork Information Center). A domain name costs about $50 per year (with a mandatory two-year payment up front).

If in addition to a domain name you want to have a Web site, the next step is to rent space on the ISP's Web server to store your site. Just create the pages on a Mac in the office and FTP them to your remote site, and your business will be on the Net.

The Intermediate Route

At some point, the low-budget method just won't cut it. If you have several people in your office who access the Net frequently, buying each one of them a modem can get expensive. Also, for such offices, the budget method's connection is probably too slow.

The first step toward solving these problems is to get a *router* — a device that connects your local network to the Internet. In many cases, the administration software that comes with the router is easy to use, designed for use by part-time network managers. Just add the router to your Ethernet network and configure the modem or ISDN BRI (basic rate interface, a device that makes an ISDN connection), using information your ISP provides.

With a router in place, the users on your network can reach the Internet without needing individual modems or accounts. The router acts as the hub of all Internet activity, so only the router needs to connect. Every computer still needs its own IP (Internet Protocol) address, which your ISP provides.

The latest trend in routers is all-in-one Internet-access devices: Each has a router, an Ethernet hub, and built-in analog-modem or ISDN BRI ports. For those who don't have a network or who need to expand an existing one, such routers provide a great way to add a few Ethernet ports and to get a connection to the Net.

One of the most distinctive of these do-everything devices is Ramp Networks' WebRamp M3 ($349 list; see review, October '97, page 42). It allows users on a network to share up to three analog modems for general Net access and lets a single

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user apply multiple modems to one ISDN-like, speedy Internet session. Dayna Communications was readying Internet Station, a similar device, as we went to press. One drawback of these two devices is that you need an Internet account for each modem you connect to them.

If you need more speed than analog modems can offer and have lots of active Internet users, consider getting an ISDN router. Farallon Communications, Ascend Communications, Shiva, 3Com, and Ramp Networks, among others, offer single-BRI ISDN routers for $700 to $1,000 apiece. You'll have to navigate the tricky waters of ISDN setup, but some router makers and many ISPs make it easier by offering procurement and support packages for new ISDN customers.

With a new ISDN connection, you need to configure IP addresses for the router and reconfigure your Macs. If you've moved from MacTCP to Open Transport (OT), changing a Mac's configuration is a snap. Simply create a template TCP/IP configuration, using one Mac, and import it into all the others.

If you're not comfortable with the prospect of adding ISDN — definitely a major overhaul to your network — be sure to look for an ISP that's familiar with both ISDN and the Mac and can guide you through the configuration process.

Total Server Control

Storing your Web site on an ISP's server is quick and easy, but you may want to have more control over your site. To gain ultimate control, move your Web server in-house. Many businesses opt to move from ISP-hosted Web sites to Mac-based ones, because it makes it easier to add content, features, and special configurations that may not work with your ISP's probably-UNIX-based system.

You can add Web-server plug-in and CGI (Common Gateway Interface) software yourself that configures the Mac to perform specific tasks, such as connecting a FileMaker Pro database to your Web site, and you don't have to hire a UNIX consultant to do it. You can also buy or download Mac-based tools that speed up site customization, analyze your site logs, and generally make the server easier to administer. With a Mac-based SMTP mail server, for example, you can maintain your own e-mail lists and manage interoffice e-mail better.

When you're ready to implement your own server, just connect it to your network with a router; give the server a static IP address (you'll first need to acquire one from your ISP for each server); and add Web-, mail-, or other server software.

You will likely need to get a dedicated connection, so users can access your site whether it's 5 P.M. or 3 A.M. Many ISPs offer dedicated modem accounts — connections that stay up 24 hours a day — for somewhat more than a standard dial-up account ($50 to $100 per month). You and the ISP must each dedicate a phone line and a modem to your connection.

Although that approach gives you a continuous connection, you'll reach a maximum transfer rate of only 33.6 kbps. That's pretty poky. In fact, it's probably intolerably slow for a busy site. You can squeeze extra speed out of a dial-up connection with ClearWay's FireSite software ($499 list). FireSite dynamically analyzes your Web site and transfers graphics files to your ISP's Web server, keeping your connection free to transfer text files and speeding up the overall connection for users of your site.

If the connection is still too slow, it's probably time to upgrade to a dedicated ISDN line — the next step in both speed (from 64 kbps to 128 kbps) and price ($100 and up per month). You can usually opt for either one or two dedicated ISDN channels. To save money, first try out *one* 64K BRI channel and keep an eye on the usage of your site. Upgrade to two channels only if your Web server gets bogged down with hits.

If the sticker shock from a dedicated connection and server hardware and software is a bit hard to take, keep in mind that you don't need to pay for individual accounts, Web space, or modems for everyone in the office.

Do Your Homework

The best way to choose the right mix of Internet services and in-house hardware is to know before you go shopping what you need and can afford. The ISP business is extremely competitive, so you'll also be doing yourself a favor if you shop around. We found that prices vary widely, even among ISPs in the same city.

Shelly Brisbin is a freelance writer based in Austin, Texas.

Connection Selection *The right connection for the right user*

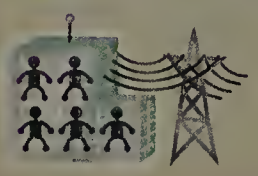
	Type of Connection	Pros	Cons	Ideal Users
BASIC 	Analog modem on each desk	Simple setup; fast access for individuals	Expensive for large groups (more than three people)	Home-office users
	Shared ISDN line	Very fast connection for one or two users	Expensive	Home/small-office users needing fast Web or file-transfer access
INTERMEDIATE 	Router with dial-up connection	Users can share equipment and access; easy to manage a group of users; no need for multiple accounts	Slow when several users need access continuously	3 to 5-person offices needing e-mail service and light Web access
	Router with ISDN	Fast access to mail, Web, and FTP; shared resources; easy to manage	Can't support in-house Web, FTP, or SMTP servers	3 to 20-person offices with moderate to heavy Web-access needs
HIGH-END 	In-house server with dial-up connection	Cheaper than ISDN; provides in-house control of Web site	Too slow for many busy Web sites	Small-scale Web publishers
	In-house server with ISDN connection	Supports full-featured Web sites; convenient management	Expensive; requires dedicated connection	Businesses with Web-based product catalogs, multimedia Web publishers

Illustration: Mike Lee

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By Jason Snell
jason@macuser.com

Master of Your Domain

What's in a name? If you're talking about a domain name, it can mean a real pain in the neck.



Illustration • Barbara Pollak

Nobody ever accused the Internet of being simple. Truth is, typing a URL into your Web browser is only the beginning of a complicated process that eventually leads you to the right computer somewhere out on the Net. The advent of domain names (such as www.macuser.com) has made surfing simpler in some ways but can cause you headaches in others.

I Am Not a Number!

You may think that typing www.something.com is not particularly intuitive, but it sure beats the process going on behind the scenes — a process so complex that one little error can cause a Web browser to fail to connect to a Web site that's actually up and running or can even make a live Internet connection look as if it's as dead as a dinosaur.

The reason the machinations of the Internet are complex and confusing is simple: The Net was created by a bunch of UNIX geeks a couple of decades ago. It's thanks to them that every machine on the Internet has its own unique address — a string of numbers (called an IP address) such as 155.40.192.69. That doesn't particularly roll off the tongue. To make things easier, we now use names you can actually remember, such as www.macuser.com.

What's not simple is translating between numbers and names. It can be a source of connection problems. It all starts when you type a domain name into your Web browser. Your computer has to look up that name and convert it back into its number in order to connect to the Web site's computer. To look up a name, your computer has to query a computer called a *domain-name server.*

No single one of the thousands of name servers knows all the keys for translating domain names into IP addresses, and vice versa, on the Internet, but each server knows the names and numbers of every user's computer in its corner of the Net. So the name servers on the Net must talk to each other.

As a result, if just one name server stops talking to all the other name servers, you'll no longer be able to look up any addresses controlled by that machine. And if your Mac stops talking to your name server, it'll seem as if the Internet has shut down —even though you're actually still connected. These name-server errors can be one of the most frustrating aspects of being on the Net, and there's little a user can do about it.

Domain Event

Since we have to live with the domain-name system, why not make the best of it? Get your own domain. But be prepared for a few hurdles.

One caveat is that there has to be a central body that makes sure no names are duplicated. That central group is called the InterNIC, and it's what you apply to if you want your own domain name — but it'll cost you. Registering a domain with the InterNIC costs $50 a year, with a mandatory two-year payment up front.

But before you register your domain, you've got to have at least two name servers configured and fill out a scary-looking form. This stuff is not for mere mortals. Your Internet service provider can fix you up, usually for a fee, or if you're *really* lucky, you'll have a friend or two (as I do) who are UNIX geeks and who can configure their name servers to handle your domain too.

Once everything has been configured and paid for, you're almost ready to experience the joy of pointing people to www.monkeypatrol.com and of getting mail at rhesus@monkeypatrol.com instead of funneling everything through MyBoringISP.com. If you've got your own personal Web server, it's a snap to make it answer to a new name. If you're using your ISP's Web server, however, you'll need to ask the ISP to configure it so that your home-page moniker isn't some abomination like www.monkeypatrol.com/~larry/monkeypatrol/, which abandons the beautiful, delicate simplicity of www.monkeypatrol.com.

Teaching a single Web server how to pose as different servers with different names isn't hard. If instead your ISP is your Web host, you should find out whether it's willing to configure its server to give you the name you want — and find out how much it'll cost. For Mac Web servers, there are several products that let your server pose as other servers, including Open Door Networks' HomeDoor (www.opendoor.com/homedoor) and Clearway Technologies' ClearlyHome (www.clearink.com/fun_stuff/plugins/clearlyhome/).

One last word of warning: If you're considering registering your own domain name, you may be disappointed. Original and easy-to-remember domain names are going fast, and once a domain name has been taken, it's gone —unless the owner of that domain fails to pay the InterNIC bill. So make a list of a bunch of possible domain names, and prepare for the worst —you may end up crying bitter tears, as I did when I discovered that I'd been beaten to the punch for monkey.com, jason.com, and teevee.com. In the end, you can become master of your domain only if you're the first one to get there.

Jason Snell, MacUser *senior editor, online, lords it over the intertext.com and teevee.org domains, with the help of his UNIX-geek pals.*

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By Bob LeVitus and Christopher Breen

helpfolder@macuser.com or tips@macuser.com

Help Folder

The great scanner/camera debate, reviving old PowerBooks, and faxing your e-mail

Scan or Cam?

I'd like to have photos for my Web page. Would I be better off using a scanner or a digital camera? I do have an excellent regular camera.

Harvey Waxman, via the Internet

Chris: We solicited the opinions of *MacUser* staff members who have had experience with the Web, scanners, and digital cameras. "Surely," we reasoned, "someone will stick up for the digital camera."
Bob: But no one did.
Chris: Although epithets were thrown fast and furiously by some of the editors, our eminent experts agreed on this: Go with the scanner.

Online Associate Editor Philip Dyer said, "I don't know if that fatheaded editor Roman Loyola would agree, but a standard camera/scanner combination is the only way to go — especially since Mr. Waxman already has a good camera. Good-quality digital cameras are so expensive that you can pay less for a decent camera and scanner and still get a better image."

Reviews Associate Editor Roman "The Man" Loyola agrees: "That dork Phil Dyer has a good point; if you're planning to ever make a high-quality printout of what you shoot, an analog camera and a scanner is the way to go."

With tongue firmly planted in cheek, MacUser Labs Project Leader Rick Oldano opines, "Why, everyone knows that the perfect Web image should be captured on a Kodak EOS/DCS1c camera, which starts at $30,000. Throw in a few lenses and other necessary accessories — I estimate the cost to be an additional $30,000 — and you *might* have the beginnings of a competent system."
Bob: I guess I'm the only one here who can see the usefulness of affordable digital cameras. May I point out that *MacUser* uses digital cameras for many of the images found on its Web site? For getting pictures up in a hurry, especially from remote locations such as trade shows, nothing beats a digicam. Just shoot, download the image to a Mac, tweak it, and upload the image to the Web site.

Web images don't need to be crystal-clear. Remember: High resolution means high bandwidth, which means long downloads. The inferior picture quality of budget digital cameras is not usually an issue for a Web site. On the Web, a picture that draws quickly is more important than one with perfect color saturation.
Chris: Bob's right, portability and convenience are the best aspects of digital cameras. But unless you're spending loads of time working remotely, I can't think of a compelling reason to choose a digital camera over a scanner.

Jazzy Startup Volume

How do I use a cartridge in my internal Jaz drive for startup?

Joe Tong, via the Internet

Chris: To start up from the Jaz cartridge, you have to do two things: In the Startup Disk control panel, choose the cartridge from which you want to start up, and make sure that it is inserted at startup.
Bob: It sounds elementary and it's fairly straightforward at startup, but there's a little trick you need to know when you restart, 'cause restarting your Mac will eject the Jaz cartridge.

If you don't push the cartridge back into the drive lickety-split, one of two things will happen:

1. If you have a hard drive or another device with a valid System Folder, your Mac will go to that device at startup.

2. You'll see the flashing question mark until you insert the Jaz cartridge.

Just remember that when you restart, you always have to manually push the Jaz cartridge back into the drive before your Mac starts booting from anything else.

Slow-Net Blues

Any advice for upgrading my PowerBook 180 so I can surf the Net more quickly?

Canny Cheung, via the Internet

Bob: My first bit of advice is not to bother looking for a new internal modem. The world has moved on, and the only way you're going to find a faster internal modem for your PowerBook 180 is to get a used one.
Chris: Unfortunately, Bob's right. The portable-computing world has settled on PC Cards for such niceties as modems and (for the 1400, at least) Ethernet connections. Internal PowerBook modems are a thing of the past. If you had a 500-series or later PowerBook, you could get a fast modem card and use the computer's PC Card capability, but I'm afraid your 180 was born too soon to accommodate a PC Card. However, Intermart Systems (www.intermartsys.com) is one of several companies that sell external PC Card readers (see Figure 1). These connect through the SCSI port of your PowerBook and open up a world of PC Card possibilities to you.

Of course, you can also get a less-expensive *external* modem. Your 180 still has the requisite modem port, and there's nothing to stop you from jacking an external into the port. You'll lose a few of the benefits of an internal modem: The Wake on Ring feature won't work, and you'll have yet another wall-wart-bearing doodad to lug around — but at least your digital alter ego will skate across the Net more expeditiously.
Bob: There are other ways to improve your PowerBook, however, and I'd recommend these upgrades for any variety of Macintosh: Buy more RAM, and get a higher-capacity hard disk. If your 180 doesn't have its upper limit of 14 MB of RAM, you should top it off. Likewise, the capacity of the hard disk that came with your PowerBook is too small for today's applications. APS has a 1-GB drive that will fit in any PowerBook except the poor old PowerBook 100. It will set you back 600 clams, but if you're tight on storage, you'll find it worth every nickel.
Chris: To find out how to upgrade many other aging Macs, take a look at "Never Say Die" (July '97, page 99).

PC Card Facts
Learn about all the options a PC Card can give you, at login.eunet.no/~sverream/pcmcia.htm

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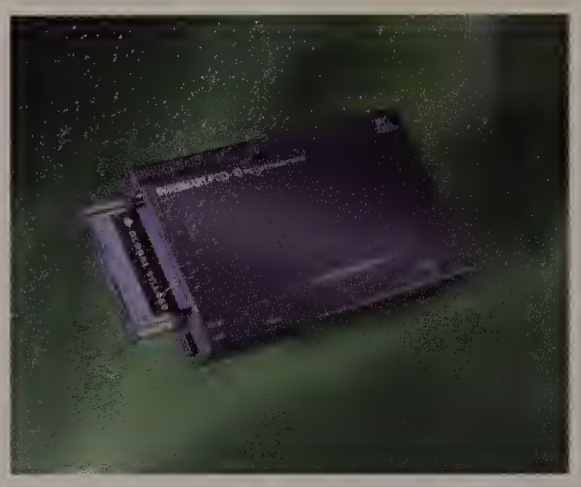


Figure 1 · One way to make an old Mac new again is to attach a PC Card reader, such as the PCD-10 ($349 list), from Intermart Systems.

Put Your Best Fax Forward

I'd like to have my computer forward incoming e-mail to a remote fax machine. Is there software that can do such a thing?

Frank E. Parcells, via the Internet

Bob: Uh-oh, I sense that Macro Boy has something in mind . . . .
Chris: Indeed, I do. Frank, there's no reason to hunt for an application to perform such a relatively simple task. With a little planning and the right e-mail, fax, and macro software, it's a cinch.

But first I should explain that depending on the kind of software you have, you may go about this differently. The overall concept should be the same, however.

First of all, you'll need an e-mail program that allows filtering — a process whereby the application performs an action based on criteria you set up. Both Qualcomm's Eudora Pro and Claris Emailer have filters — although Emailer calls them Mail Actions.

Here's where the planning begins: Decide whose messages you want forwarded, and create a filter for that person's (or those people's) e-mail. For example, if I wanted to fax-forward messages only from Bob, I'd select From:Bob LeVitus as one of the filters (see Figure 2).

Next, specify Print as the postfiltering action. Now go to the Chooser, and select your fax modem's driver. Because I use a Global Village modem, I'd choose the GlobalFax icon. When you return to your e-mail program, the Print item on the File menu should now read Fax.

Now the fun begins: the macro. The basic idea behind the macro is that when the Fax/Print window appears, the macro selects from your fax address book the name of the person you want the fax directed to, moves that name to the Destination field, and clicks on Send.

I've pulled this trick with both WestCode Software's OneClick and CE Software's QuicKeys. As much as I'd like to go into agonizing detail about how I created the macros for these programs, to save valuable column space I'm posting them online instead. You can find them at www.macdownload.com.
Bob: Excuse me for butting in on the geek-fest you're holding here, but may I suggest a solution that's a tiny bit simpler?
Chris: Only if you agree to include one techie element.
Bob: Fair enough. You can also use the filtering option Chris is so fond of to create an automated response that reads, "I can't be reached by e-mail right now. Please fax me at this number: xxx-xxx-xxxx." As long as the person sending the original e-mail picks up his or her messages in a timely manner, you'll soon have a fax sent directly from the source.

Zipping Between Machines

Can I download Windows 95 files to my Mac from an online service, save them to disk, and then install them on a Win 95 machine? Will my Zip drive help in transferring the files?

James Dillon Jr., via AOL

Chris: Let's see, I count four questions there. The answers — in order — are:

1. You betcha. **2.** Uh-huh. **3.** *Oui! oui!* and **4.** Does *ursus americanus* deposit its waste products in forested regions?
Bob: In other words: Yes.
Chris: But you have to plan ahead.

To begin with, unlike Macs, not all PCs are equipped with a SCSI port — and you'll need that SCSI port to connect your Zip drive to the PC. You must add an extra card to many PCs to get SCSI. Check your Windows machine to make sure that it supports SCSI. If it doesn't, you'll have to buy either a SCSI card or another Zip drive with a parallel-port interface or just skip the Zip altogether.

If the PC does have SCSI connectors, examine them. Many recent Wintel boxes sport a SCSI-2 port — these require an adapter in order to work with the SCSI cable packaged with a Mac Zip drive. Iomega's Jaz drives come with both a SCSI-2 cable and the Mac adapter.

Windows 95 is surprisingly unaware of Mac disks. If you drop a Mac-formatted cartridge into a Zip drive connected to a PC, Windows will pitch a fit. Trying to access your Mac-formatted Zip cartridge will result in Windows asking if you'd like to reformat it. So here's an important tip: Format your Zip cartridge on the PC. Once you've done that, it's a simple matter to copy the files to the Zip drive on the Mac and then tote it all to the PC. With the PC Exchange control panel installed, your Mac won't even flinch when you insert a PC-formatted Zip.
Bob: Listen, Junior, all this dragging of drives can be, well, a *drag*. If you're talking about only a couple of megabytes' worth of stuff, you may want to skip all this and just copy the files to floppies. In this kind of situation, I use Tom Brown's $15 shareware program ZipIt to compress a bunch of files in a PC-friendly .zip archive and then segment the archive into chunks that fit onto DOS-formatted floppies (Aladdin Systems' StuffIt Deluxe can do the same, albeit for more cash).

You don't need to run out and buy a box of DOS-formatted floppies either. Just toss any old HD floppy into the drive, select Erase Disk from the Finder's Special menu, and choose DOS 1.4 MB from the Format pull-down menu.

Bob LeVitus is the author of Mac OS 8 for Dummies *and the Mac columnist for the* Houston Chronicle. *Christopher Breen recently coauthored* The Macintosh Bible Guide to Games.

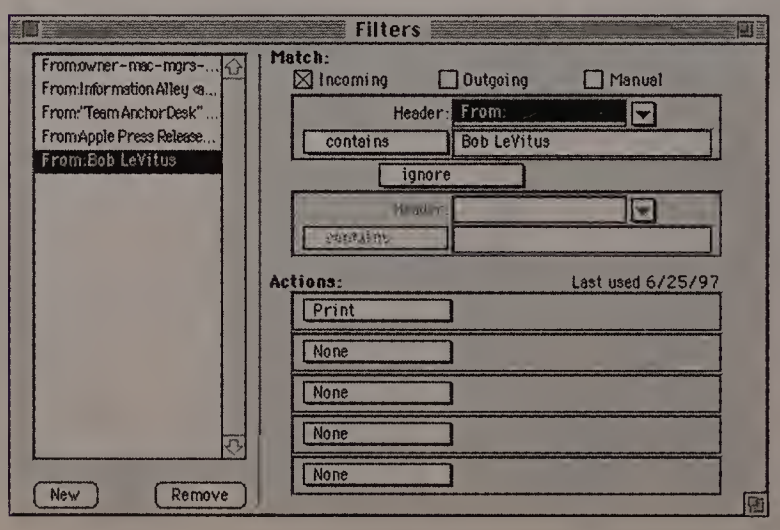


Figure 2 · Faxing e-mail is a piece of cake if you start with an e-mail program that allows filtering, such as Eudora Pro (shown here) or Claris Emailer. You'll also need to create a macro, using WestCode Software's OneClick or CE Software's QuicKeys.

Photography · Michael Falconer

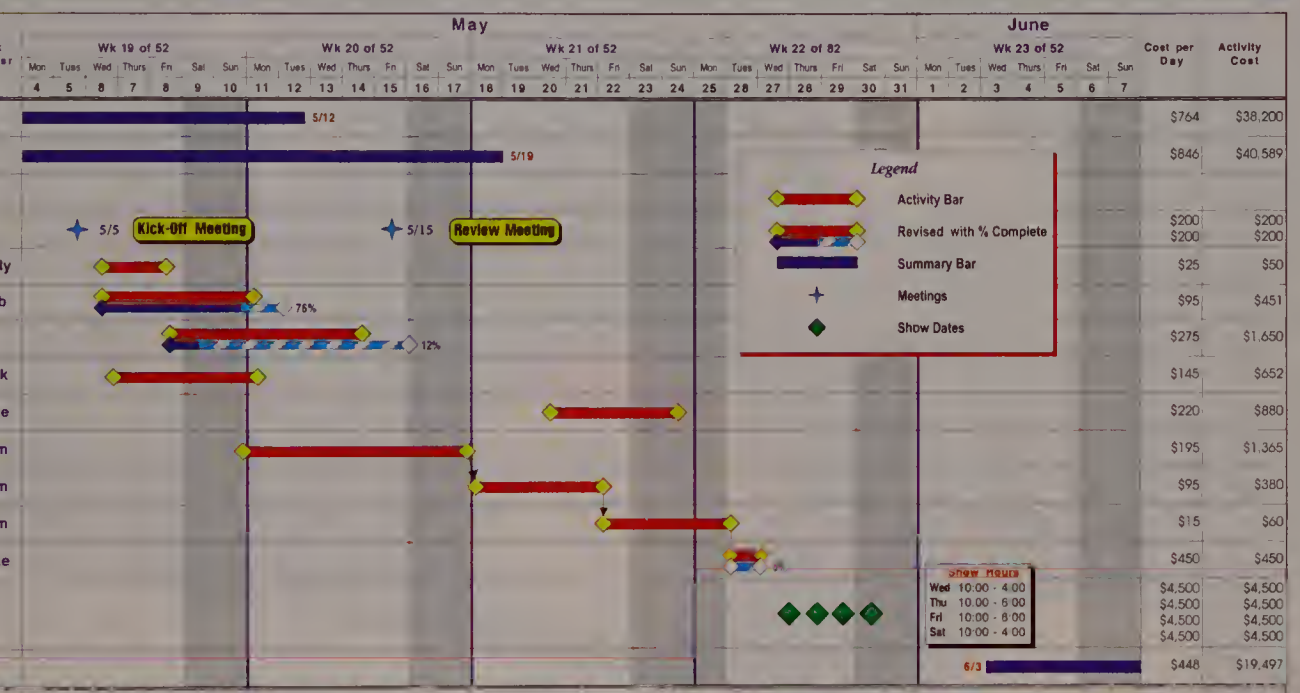
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Trade Show Schedule

Page 1 of 1

Shows/Tasks	Start Date	Finish Date	Duration (Days)	Task Leader	Cost per Day	Activity Cost
Trade Show # 1...	3/23	5/12	50.00		$764	$38,200
Trade Show # 2...	4/1	5/19	48.00		$846	$40,589
Trade Show # 3						
Meetings	5/5 5/15				$200 $200	$200 $200
Travel Arrangements	5/6	5/8	2.00	Emily	$25	$50
Complete Show Docs	5/6	5/11	4.75	Bob	$95	$451
Marketing Materials...	5/8	5/14	6.00		$275	$1,650
Press Release/Publicity	5/6	5/11	4.50	Nick	$145	$652
Presentation Rehearsals	5/20	5/24	4.00	Kate	$220	$880
Booth Modifications	5/10	5/17	7.00	Sam	$195	$1,365
Pack Materials	5/18	5/22	4.00	Sam	$95	$380
Ship Booth/Literature	5/22	5/26	4.00	Sam	$15	$60
Booth Set-up	5/26	5/27	1.00	Kate	$450	$450
Show Dates	5/27 5/28 5/29 5/30				$4,500 $4,500 $4,500 $4,500	$4,500 $4,500 $4,500 $4,500
Trade Show # 4...	6/3	7/16	43.50		$448	$19,497
Projected Spending per Week						
Cummulative Projected Spending per Week						



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Created by: Jim Martin
Trade Show Production Mgr.

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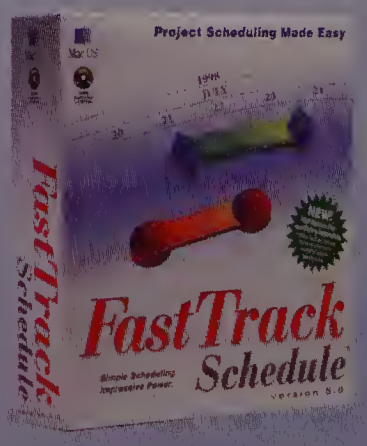
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By Martin Wong
maxuser@macuser.com

Mouse of Blues

You don't have to be intimidated by pentatonic scales, augmented fourths, or riffs — your Mac can help you learn to play the guitar at your own speed



Illustration · David Ricceri

IT WAS A STARLIT NIGHT, and I was sitting with some friends who had just moved to the country. One of them mentioned that he'd recently picked up that old guitar he had lying around. He was finally getting serious about learning to play. Having endured the struggles of teaching myself to play, I wondered what advice I could give him. I could point him in the direction of a good teacher or maybe send him literature from the massive piles I've collected over the years, but that would cause him more work than pleasure.

Then I remembered that my friend had just gotten a new Macintosh. If I steered him toward the right Mac software, the learning could be simply fun. As the answer came to me, I shouted into the serene evening air, "You can use your Mac to teach you how to play!"

Get in Tune

There's so much to learn about the guitar — where's a good place to begin? A bunch of programs are geared toward those just starting out. Some are clearly better than others, and different ones are suited to different learning styles.

If you're the type who likes to learn the basics backward and forward before charging on to advanced concepts, eMedia's **Guitar Method** (♦♦♦½, $59.95 list) is one of the better choices for you. In over 60 lessons, it thoroughly covers the basics, such as holding the guitar correctly and playing a minor scale.

The beauty of this program is that it keeps you entertained while you're learning to play. That's partly because it gives you the satisfaction of immediately learning familiar songs, such as "Amazing Grace" and "La Bamba," while you're learning basic concepts. The application also keeps you engaged by varying its lessons: You learn proper finger placement by watching videos, you get tips from audio recordings and written text, and you learn songs by playing along with your Macintosh.

Despite the thoroughness and variety of the instruction, this program has its drawbacks. The video is jumpy in spots, and the comments can get monotonous. Also, although it gets you up to speed on playing simple chords and songs, it never gets to some important intermediate concepts such as scales and modes.

To get a broader range of lessons, check out Red Door Interactive's **Guitar Shop Vol. 1** (♦♦♦½, $39.98 list). This application starts off easy but continues to more-difficult concepts. That doesn't make it better than Guitar Method — in fact, its teaching method isn't as entertaining — but it does expose you to a greater variety of concepts through easy-to-understand lessons.

The interface is fairly bare compared to that of Guitar Method. The screens in each lesson have roughly the same look, containing some written text and a video clip that demonstrates a concept. Sometimes the video is choppy and can even be confusing, because you get to see only one hand.

If you think Guitar Shop's interface is dull, you ought to take a look at Leydon Software's **My Guitar Buddy** (♦♦, $14.95 estimated street). Most screens show a drawing of a guitar neck (with dots that light up to show you fingering) and not

Free Lessons and Sheet Music
The Guitar Page, which offers online guitar lessons as well as tablature for current and vintage rock music, is at www.houghton.demon.co.uk/guitar/index.htm

much else. The program would benefit greatly from some additional elements, such as video demonstrations.

The information it does impart doesn't scratch below the surface. For example, the finger exercises are helpful but too short. Playing along with its music (choppy in spots) also proved to be a chore, because the application doesn't give you any written music to follow.

On a Different Note

Another program aimed at beginners, but with a unique twist, is a hardware/software combo: Lyrrus' **Guitar 101** (♦♦♦½, $49.95 estimated street) and **G-Vox Musician Plus** (♦♦♦, $349.95 estimated street). Each is a stand-alone product, but they can be used together to get more interactivity than you get with the other programs.

The G-Vox is a pickup device that attaches to your guitar as well as to an interface box that connects to the Mac's serial port. It lets your Mac detect which notes you're playing on the guitar and then display those notes on a bar of music on-screen, so you can see if you're playing the right notes. Unfortunately, you get very few music samples with this expensive product, but you can purchase additional libraries.

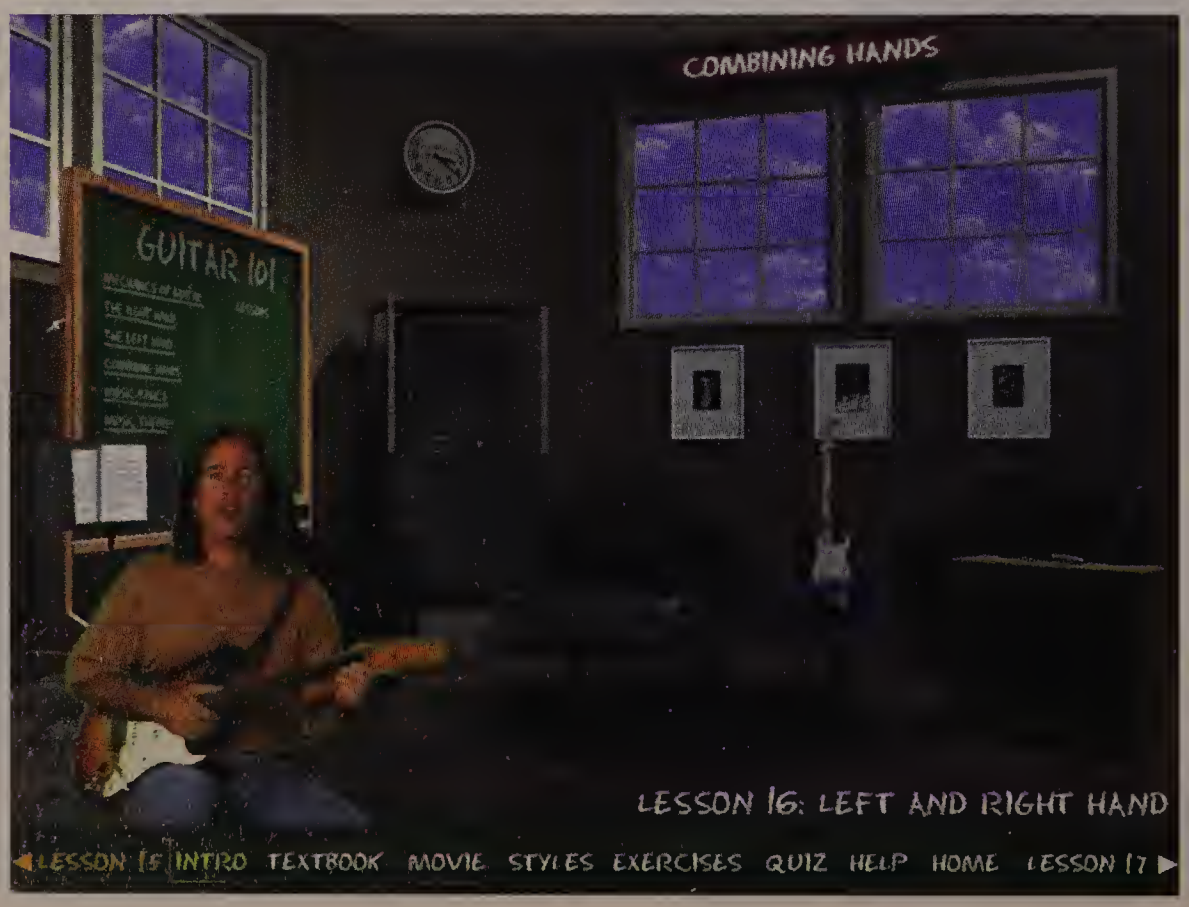
The system works with nearly any electric or acoustic guitar, but the guitar must have steel strings (not the nylon strings of some classical guitars). The G-Vox is a bit finicky — I had a hard time positioning it correctly to get a good response from the pickup.

The software part of this combo, Guitar 101, has an impressive interface that simulates the look and feel of a laid-back classroom (see screen shot). Its lessons focus on basic music theory and techniques, are full of useful pointers, and include exercises to help drive the lessons home. I was disappointed, though, that the sound in the exercises was not like that of a real guitar.

Off the Record

Maybe it's not the basics you want to learn. Suppose you just want to play some songs. Ubi Soft Entertainment's **Classic Rock Guitar Vol. 1** (♦♦♦♦, $59.95 estimated street) is the answer. Classic Rock contains eight well-known songs, such as Jimi Hendrix's "Hey Joe," and is aimed at intermediate guitarists. A basic understanding of the guitar is probably necessary to make good use of this program.

It gives you a couple of ways to learn to play. You can play along with a full version of the original music, if you're comfortable following the tablature that scrolls along the bottom of the window, or you can focus on a particular passage and learn such details as the picking and strumming techniques specific to that passage. The latter method is particularly helpful, because you can focus on harder aspects of a song before moving on. This software also gives you numerous tips and video demonstrations.



Directory

Classic Rock Guitar Vol. 1
Ubi Soft Entertainment, San Francisco, CA
800-824-7638 or 415-547-4000
www.ubisoft.com

Guitar 101 and G-Vox Musician Plus
Lyrrus, Philadelphia, PA
800-789-4869 or 215-922-0880
www.lyrrus.com

Guitar Method
eMedia, Seattle, WA
888-363-3424 or 206-329-5657
www.emedia.org

Guitar Shop Vol. 1
Red Door Interactive, St. Charles, MO
800-949-2983 or 314-278-1644
www.reddoorint.com

My Guitar Buddy
Leydon Software, Philadelphia, PA
215-848-7933

Ritchie Sambora Interactive Guitar
Enteractive, New York, NY
800-433-4464 or 212-221-6559
www.enteractive.com

Its biggest flaw is that navigating through the program can be confusing, because it's not well organized.

If you're a Bon Jovi fan, Enteractive's **Ritchie Sambora Interactive Guitar** (♦♦♦, $29.95 estimated street) may be the perfect choice for you. Have you ever wondered how "Livin' On a Prayer" is played? This and nine other Bon Jovi hits are broken down to help you learn some of the techniques lead guitarist Ritchie Sambora used.

Sambora himself demonstrates a few fundamentals of playing the guitar. Besides getting some playing tips, you also learn about this famous guitarist — hear his opinion on past Bon Jovi records, view clips from music videos, and see Sambora playing some of his favorite axes. Not all the coverage is great — some interviews with him are thin, nothing more than a comment or two. Don't expect much emphasis on the guitar from this CD-ROM, which borders on Sambora worship.

Standing Ovation

With all these options available for learning, my friends will be strumming away in no time. Who knows, pretty soon they might be showing me some tricks. Wait, where'd that CD-ROM run off to?

Martin Wong, MacUser Labs' associate project leader, specializes in guitar jams and printer unjams.

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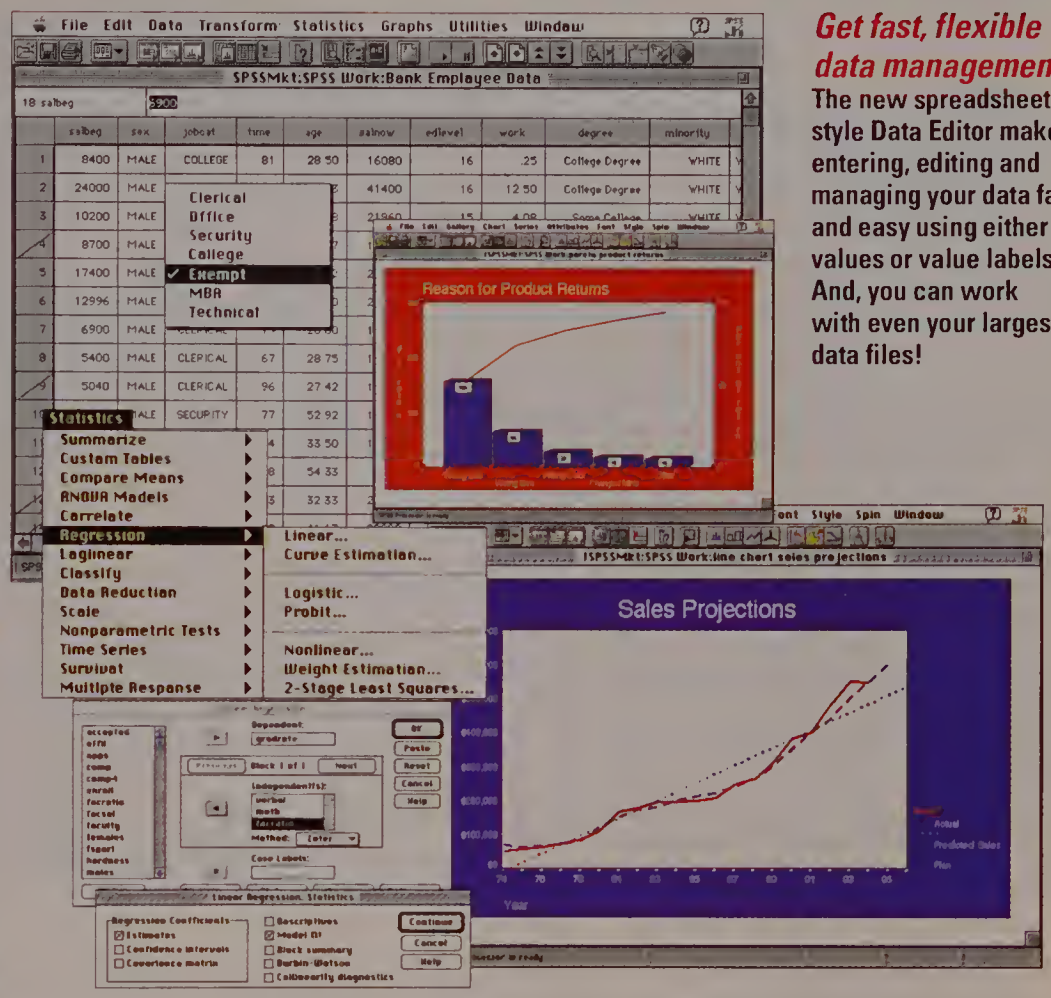
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By Andy Ihnatko
andyi@macuser.com

An Alan Smithee Computer

We're ready for our close-up, Mr. Jobs

OK, LOOK: I don't *care* about alliances with Microsoft. I don't *care* about Rhapsody coming in on schedule. I don't care about market share. I don't care about CHRP or licensing issues. And I don't care about who fills the vacant (at this writing) slot on Apple's board of directors. All I know is that I certainly won't be one of them. Steve Jobs is a man capable of many wonderful things, but letting go of a grudge isn't one of them. As my silent telephone effectively demonstrates, he hasn't forgotten that I spilled a whole can of Hawaiian Punch all over his Stray Cats T-shirt during the US Festival. It was an *accident,* Steve . . . *15 years* ago! Let it go!

And it's a damned shame, because I alone can see that the usual headline-grabbing issues are utterly meaningless in shaping the Mac's destiny. Really, I'm more concerned about bad product placement. Have you seen the sort of movies where Apple has won product placement?

Take *Independence Day,* for example. A massive armada of insectoid aliens encircles Earth and broadcasts a countdown clock planetwide, unaware that this signal could be intercepted and exploited by the traditional enemy of all insectoid alien invaders, the local cable-television employee. Said employee then spends a lot of time in CodeWarrior writing a nifty little app so his PowerBook can track and dramatically display the time remaining until planetary holocaust, instead of actually *doing* anything about it. Later, the cable guy plugs this same PowerBook into the aliens' computer system and immediately causes the worst system crash in galactic history.

Sure . . . I'm going to have a real easy time convincing my company's IS guy to let me put my Power Mac on his Windows network after that. Worse than this obvious PR blunder is the embarrassing way Apple went and allowed a Mac to take part in one of the most evil clichés in modern cinema, the pointless Big Numerical Countdown to Destruction. What's next? During a high-speed downtown car chase, have Jackie Chan skid through a fruit cart loaded with 5300s?

Well, granted, they *are* already under a seven-year warranty extension, and they *would* be receiving a far more honorable death than all those Macintosh XLs Apple buried in Utah. And that's all I'm looking for in a Mac product placement really: a simple dose of dignity, just the tiniest endorsement of my bleak and pathetic lifestyle by a small team of grotesquely overpaid Hollywood phonies. But where to find any dignity in most of Apple's hits in the past couple of years?

Perhaps the Mac's most prominent recent role was in *Mission Impossible.* This was more than a cameo appearance, actually — it was an enormous mass-media cross-promotion. If only this sort of deal was cut with an actual movie instead of with a two-hour exercise to see exactly how many components of a film's production Tom Cruise can stick his mitts into and mess up. Even *The Net* (which featured an entire Macworld Expo chase scene) falls short. Yes, it was a neat movie and it did well at the box office, but just who the hell noticed the Macs? An orange Boston terrier dressed like Elton John can't get noticed when it's sitting in the lap of a bathing-suited Sandra Bullock!



Granted, there have been one or two victories. Just last week, I saw *Fetishes,* a new documentary about underground bondage and S&M parlors in New York, and felt that familiar stirring sense of pride upon seeing that all the dominatrices used Macs. Obviously, there are some humiliating ritualistic inflictions of pain and abuse that are beyond the pale even for women who put out cigarettes on paying clients' tongues. And sure, it was cool to see Forrest Gump become one of the marks (investors . . . *investors*) in Apple's initial public offering.

But these sorts of films are few and far between. No, ironically, when it comes to securing only the best-possible product placement for our platform of choice, we're going to have to let Forrest Gump show us the way. Hollywood, against all odds, makes as many as seven decent movies each and every year. We have the technology to simply add whatever Mac hardware is in style, *after* the movie has proven to have set its hooks into the hearts of America. Imagine! We talk to the Coen Brothers, and for a pair of Twentieth Anniversary Macs, suddenly in the scene in *Fargo* in which loser car salesman Jerry Lundegaard is being interrogated by Chief Marge, he lies that he can't account for the stolen Ciera because his computer crashed and Marge advises, "Oh, yah? Why dontcha let me just fire up that diskette on my PowerBook here? My Mac can mount anything, you betcha!"

Steve, again, I'm sorry about the T-shirt. But for the sake of the company . . . *call me.*



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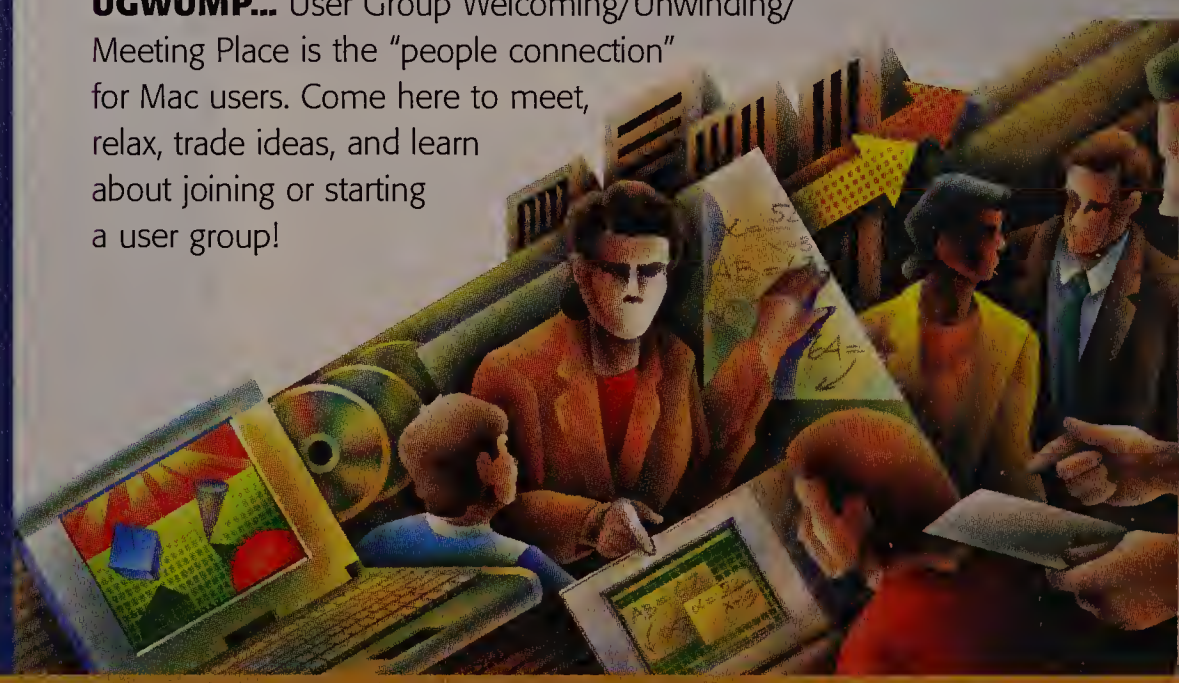
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Services for the Physically Challenged
We're committed to ensuring that our physically challenged attendees receive all the services they need to make their visit productive. Call us at 800-645-3976 for more details on the services we offer.



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MACWORLD EXPO/SAN FRANCISCO REGISTRATION FORM

MACWORLD Expo/San Francisco • January 5-9, 1998 • Moscone Convention Center

1. REGISTRATION SELECTION AND FEES (SELECT ONE)

PRE-REGISTRATION DEADLINE IS DECEMBER 1!

Please choose your package and fill out the form completely. Incomplete forms will be returned. Please use one form per person; make photocopies for additional people.

All Conference and Keynote Sessions are on a first-come, first-served basis, with the exception of the Macworld/Pro Full-Day Workshops.

	Advance Registration *(before 12/1)*	On-Site Registration *(after 12/1)*
❑ **Package 1* – Full Package (Jan. 5-9)** Includes Macworld/Pro Full-Day Workshops, Macworld/Pro Conference Sessions, Lunch (Mon.-Wed.), ALL Keynotes, MACWORLD Expo Conference Sessions, and Exhibits.	**$895**	**$995**
❑ **Package 2* – Macworld/Pro Full-Day Workshops and Conference (Jan. 5-7)** Includes Macworld/Pro Full-Day Workshops, Macworld/Pro Conference Sessions, Lunch (Mon.-Wed.), ALL Keynotes, and Exhibits	**$795**	**$895**
❑ **Package 3 – Macworld/Pro Conference (Jan. 6-7)** Includes Macworld/Pro Conference Sessions, Lunch (Tues.-Wed. only) ALL Keynotes, and Exhibits.	**$595**	**$695**
❑ **Package 4* – Macworld/Pro Full-Day Workshops (Jan. 5)** Includes Macworld/Pro Full-Day Workshops, Lunch (Mon. only) ALL Keynotes, and Exhibits.	**$295**	**$345**
❑ **Package 5 – MACWORLD Expo Conference (Jan. 6-9)** Includes MACWORLD Expo Conference Sessions, ALL Keynotes, and Exhibits.	**$170**	**$195**
❑ **Package 6 – Exhibits Only (Jan. 6-9)** Includes admission to the exhibits only.	**$25**	**$40**

*** For Packages 1, 2 & 4, a Macworld representative will contact you for your Workshop selection**

- Confirmation of your registration will be sent to you once your registration is processed. Pre-registration deadline is December 1, 1997.
- U.S. & Canadian Badges: will be mailed after December 22.
- International Badges: (excluding Canada) will be held on-site at the Pre-Registered Attendee Counter in the North Lobby of the Moscone Convention Center.
- Registration Hours: January 4, 12:00 p.m. - 5:00 p.m.; January 6-8, 8:00 a.m. - 6:00 p.m. and January 9, 8:00 a.m. - 4:00 p.m.

❑ Please check here if you are disabled and require special services. Simply attach a written description of your needs.

Conditions and Policies: Payment must accompany form for registration to be complete. Purchase orders not accepted. Registration forms received after Dec.1 will be returned unprocessed. After this date you must register on-site. This form cannot be used for on-site registration. All registration fees are non-refundable and credentials are non-transferable. A $20 fee will be charged for all returned checks.

2. CUSTOMER INFORMATION

First Name M.I. Last Name

Title

Company

Street Address (please include apt. #, suite, mail stop, etc.)

P.O. Box (if applicable)

City State/Province Zip Code/Postal Code

Country Telephone Extension

Fax Internet/Email Address

3. ATTENDEE PROFILE

MUST BE FILLED OUT TO PROCESS YOUR BADGE.

WHAT IS YOUR INDUSTRY? (Check One Only)
❑ 1. Accounting/Finance
❑ 2. Aerospace
❑ 3. Architecture/Construction/Process Industries
❑ 4. Art/Design/Creative Services
❑ 5. Arts & Entertainment
❑ 6. Computer Reseller/VAR/VAO/Service
❑ 7. Consulting
❑ 8. Education
❑ 9. Engineering/R&D
❑ 10. Government/Military
❑ 11. Health/Medical Services
❑ 12. Legal Services
❑ 13. Manufacturing (Computer Industry)
❑ 14. Manufacturing (Non-Computer Industry)
❑ 15. Marketing/Sales/PR/Communications
❑ 16. Printing/Publishing
❑ 17. Transportation
❑ 18. Utilities
❑ 19. Other_____

WHAT IS YOUR JOB FUNCTION? (Check One Only)
❑ 20. Art Director/Graphics
❑ 21. Consultant
❑ 22. Controller/Treasurer/Accounting/CFO
❑ 23. Corporate Executive
❑ 24. DP/IS Management/CIO
❑ 25. Editorial/Writing
❑ 26. Educator
❑ 27. Engineering/Scientific/R&D
❑ 28. Human Resources
❑ 29. Management/Department Head
❑ 30. Marketing/Sales
❑ 31. Network Management
❑ 32. Professional (Lawyer, Doctor, etc.)
❑ 33. Programming/Analysis
❑ 34. Purchasing
❑ 35. Software Developer
❑ 36. Training
❑ 37. Other_____

WHAT IS THE SIZE OF YOUR ORGANIZATION?
❑ 38. Under 50
❑ 39. 50-99
❑ 40. 100-499
❑ 41. 500-999
❑ 42. 1000 & Over

WHICH PERSONAL COMPUTERS DO YOU USE? (Check all that apply)
❑ 43. Macintosh Powerbook Series/Duo Series
❑ 44 Macintosh II Series
❑ 45. Macintosh Performa Series
❑ 46. Macintosh Centris Series
❑ 47. Macintosh Quadra Series
❑ 48. Macintosh Workgroup Series
❑ 49. PowerMac
❑ 50. Newton
❑ 51. Mac clone
❑ 52. IBM PC or compatible desktop
❑ 53. IBM Laptop/Notebook
❑ 54 Other_____

HOW MANY MACINTOSH COMPUTERS ARE USED IN YOUR ORGANIZATION?
❑ 55. 0
❑ 56. 1-10
❑ 57. 11-25
❑ 58. 26-50
❑ 59. 51-100
❑ 60. 101-500
❑ 61. 501+

ARE THE COMPUTERS AT YOUR ORGANIZATION NETWORKED?
❑ 62.Yes
❑ 63. No

WHICH APPLICATIONS DO YOU OR YOUR ORGANIZATION UTILIZE? (Check all that apply)
❑ 64 Accounting/Finance
❑ 65. Agenda Minder/Scheduler
❑ 66. CAD/CAM
❑ 67. CASE Tools
❑ 68. Database
❑ 69. Desktop Publishing
❑ 70. Digital Video
❑ 71. Education
❑ 72. Graphics
❑ 73. Multimedia
❑ 74. Project Management
❑ 75. Speadsheet
❑ 76. Word Processing

WHICH (IF ANY) OF THESE SERVICES DOES YOUR ORGANIZATION UTILIZE? (Check all that apply)
❑ 77. America On-line
❑ 78. AT&T
❑ 79. CompuServe
❑ 80. Prodigy
❑ 81. Other_____

MWAB

4. PAYMENT METHOD (YOU'LL BE CHARGED FOR ALL REGISTRATIONS RECEIVED INCLUDING DUPLICATES.)

❑ Check enclosed (make payable to MACWORLD Expo). Enclose check and form in an envelope.

❑ Master Card ❑ Visa ❑ American Express Amount $_____

Account Number Expiration Date

If card holder is other than registrant, please print card holder's name below:

First Name M.I.

Last Name Card Holder Signature

Payment must accompany form for registration to be complete.

Important: Don't pay twice for this event! You will be charged for all registrations received, and not refunded for duplicate registrations. Please do not fax this form in more than once and if you fax, please do not mail in as well.

REGISTER NOW!

Use either ONE of the following methods to register with this form:

FAX **Fax to:** 781.440.0359. Faxed registration forms must include credit card information.

U.S. MAIL **Mail to:** MACWORLD Expo/San Francisco P.O. Box 9103, Norwood, MA 02062-9103.

OR FOR MORE INFORMATION:

WWW Visit the MACWORLD Expo Web site at **www.macworldexpo.com**

For more information, call: 800.645.EXPO or 781.551.9800 outside of the U.S.

(TTY) Service is available for the hearing impaired. Dial 781.440.0366.

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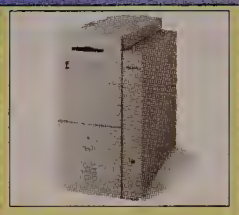
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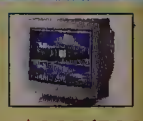
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1a. For which of the following Mac-related products do you specify, recommend, approve, purchase or influence the purchase?

1b. Which of the following do you plan to purchase in the next 12 months? (Check all that apply.)

	Purchase Involvement		Plan to Buy
Desktops/PowerBooks	◯	1	◯
Monitors	◯	2	◯
Printers	◯	3	◯
Storage Devices	◯	4	◯
Networking/Data Communications	◯	5	◯
Internet/Intranet products/services	◯	6	◯
Software: business/productivity	◯	7	◯
graphics/design	◯	8	◯
interactive publishing/ multimedia	◯	9	◯
entertainment	◯	10	◯
education	◯	11	◯
other software	◯	12	◯
Any other products	◯	13	◯

2. Are you employed, and involved in purchase decisions for 5 or more Macs? ◯ Yes (1) ◯ No (2)

3. What's Your Opinion?
What are your main frustrations in making Mac-related purchase decisions?

- ◯ 1. Lack of expertise in assessing products
- ◯ 2. Difficulty in installing or using products
- ◯ 3. Too many choices
- ◯ 4. Not enough choices
- ◯ 5. Unclear needs
- ◯ 6. Concern that cheaper, better products are about to come out
- ◯ 7. Other (please specify) _____

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960 Draw/Paint/DTP Software
961 Image-Editing Software
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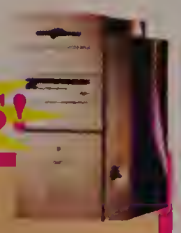
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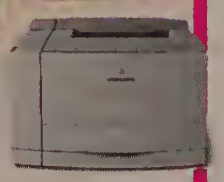
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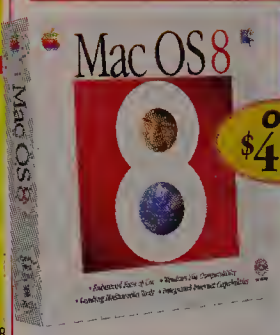
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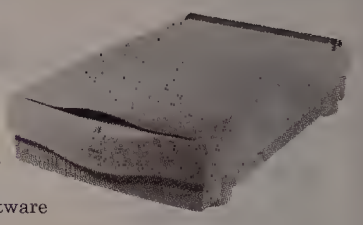


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9.1GB Cheetah	ST19101N	8ms	10000	$1299	$1349
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4.5GB Cheetah	ST34501W	8ms	10000	$899	$979
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- 4GB hard drive
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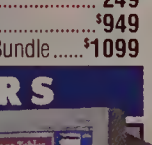
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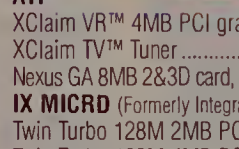
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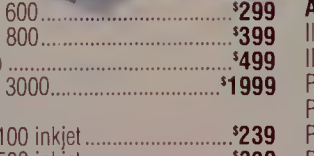
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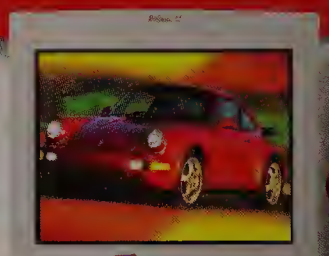
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64MB/4GB/24XCD/Iomega Zip Drive
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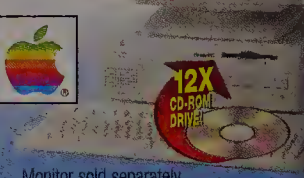
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CPU 0786 ..... $5399

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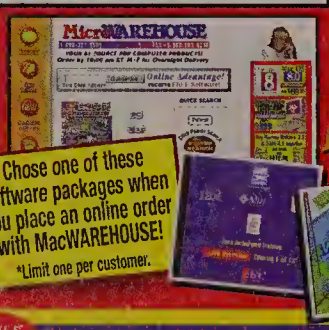
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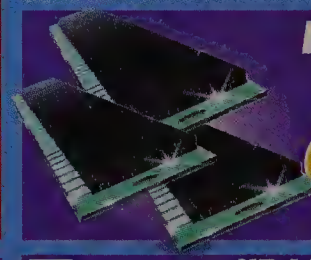
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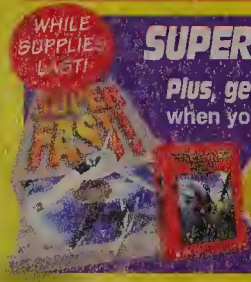
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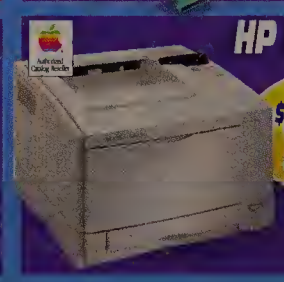
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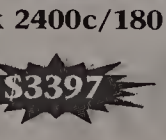
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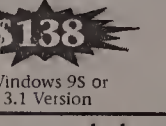
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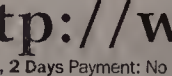
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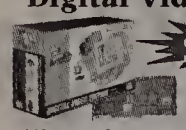
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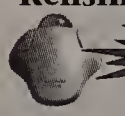
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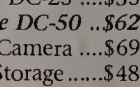
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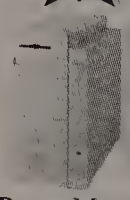
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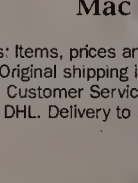
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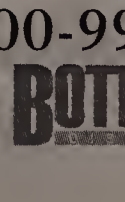
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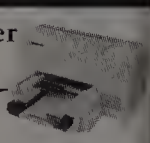


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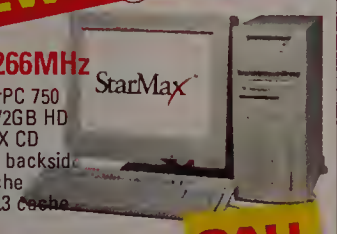


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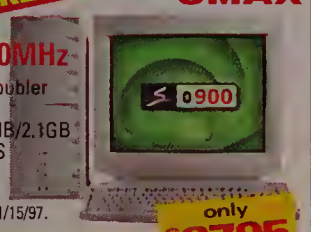
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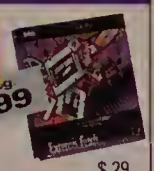
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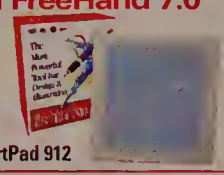


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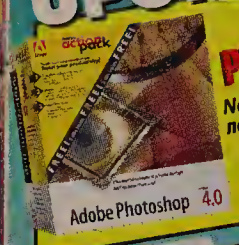
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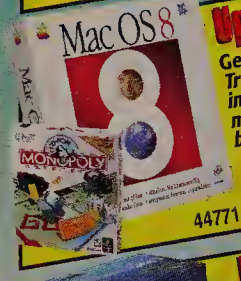
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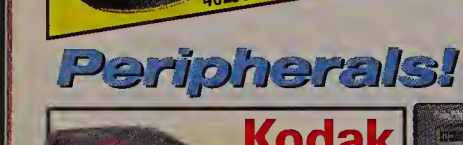
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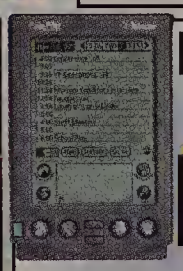
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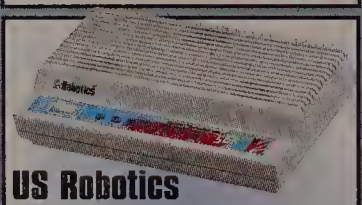
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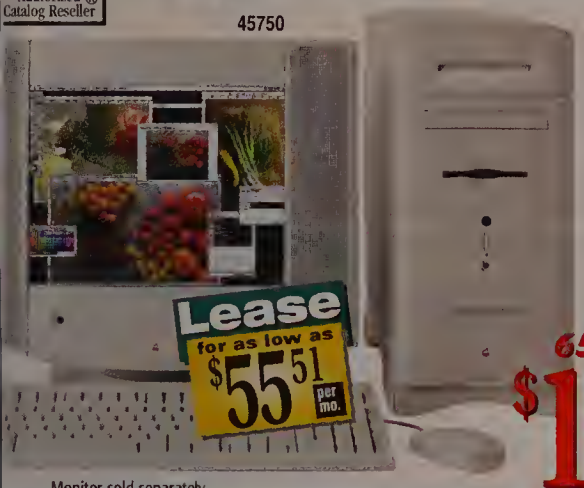
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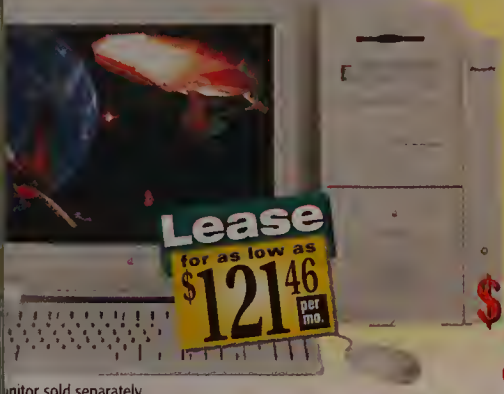
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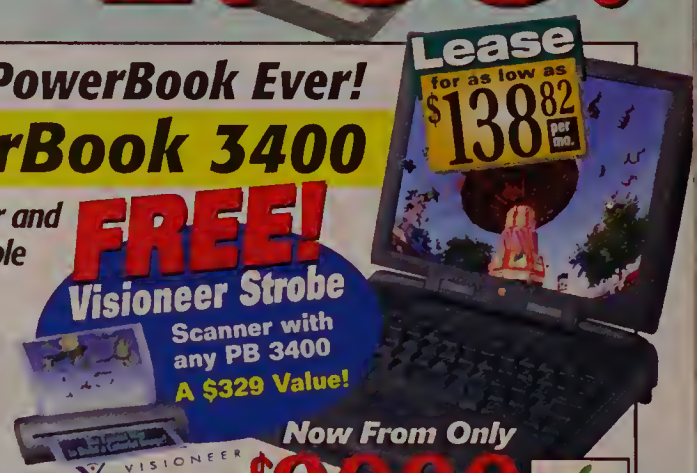
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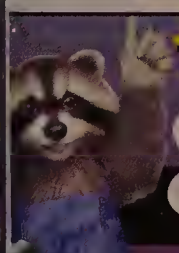
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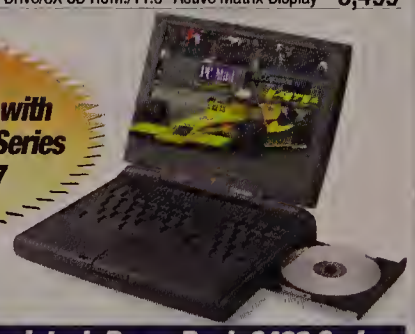
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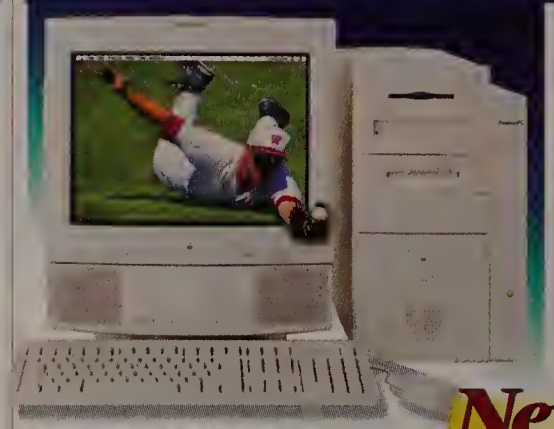
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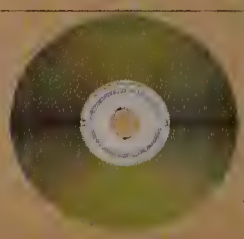
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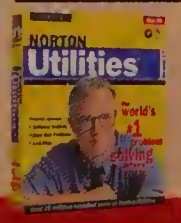
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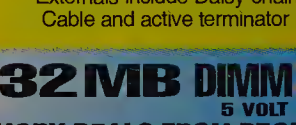
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Model	RAM	HDD	CDROM	Misc.	Price	Part #
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6400/200	16MB	2.4GB	8x	Basic Software	$1,299	#A1189
6500/225	48MB	4GB	12x	Home Software	$1,695	#A1945
6500/250	32MB	4GB	12x	Home Software	$1,829	#A1937
6500/250	32MB	3GB	12x	SOHO	$2,179	#A1943
6500/300	32MB	4GB	12x	Home Software	$2,549	#A1939
6500/275	48MB	4GB	12x	Creative Studio	$2,549	#A1941
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3400c/200	16MB	2GB	6x	Modem/10BT	$3,849	#A1734
3400c/240	16MB	3GB	12x	Modem/10BT	$4,895	#A1736
1400cs/117	12MB	750MB		10" Dual Matrix	$1,849	#A1720
1400cs/117	12MB	750MB	8x	10" Dual Matrix	$1,995	#A1931
1400c/133	16MB	1GB	6x	10" Active Matrix	$2,389	#A1726
1400cs/133	16MB	1.3GB	8x	11.3" Active Matrix	$2,349	#A1936
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C500e/200	16MB	2GB	12x	10BaseT	$1,095	$1,070	#A1977
C500LT/200	16MB	2GB	8x	1MB VRAM	$ 995	$ 975	#A1681
C600/200	16MB	2.1GB	8x	33.6 Modem	$1,195	$1,095	#A1643
C600LT/240	24MB	2.1GB	8x	33.6 Modem	$1,395	$1,295	#A1983
C600x/240	32MB	3.0GB	12x	10BaseT	$1,795	$1,645	#A1701
C600x/280	32MB	4.0GB	12x	10BaseT	$2,195	$1,995	#A1705

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3000/240	Minitower	603e	2.5GB	8x	SOHO	$2,149	#A1054
3000/240	Minitower	603e	2.5GB	16x	Enterprise 1	$2,295	#A1060
4000/160	Minitower	604e	1.5GB	8x	SOHO	$1,849	#A1056
4000/200	Minitower	604e	2.5GB	8x	Basic	$2,449	#A1063
4000/200	Minitower	604e	4.3GB	16x	Enterprise II	$2,595	#A1062
5000/300	Minitower	603e	4.3GB	16x	Basic	$2,295	#A1046
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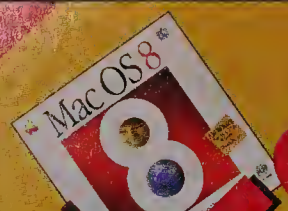
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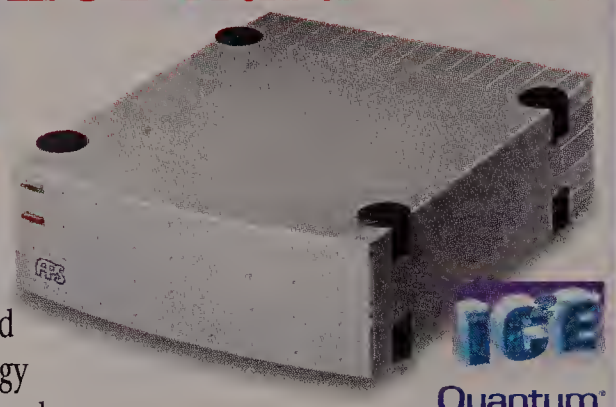
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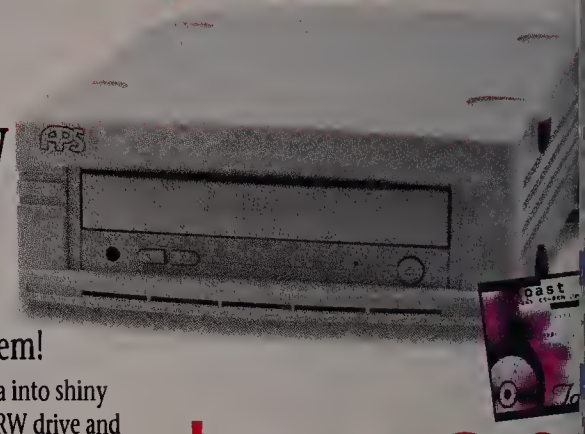
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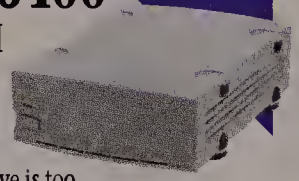
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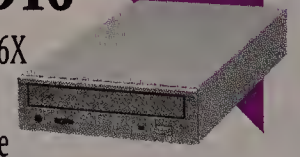
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APS Q 3000	Quantum Fireball Stratus, 3118MB, 5400 rpm	299.95	369.95	399.95
APS Q 4000	Quantum Fireball Stratus, 4136MB, 5400 rpm	379.95	449.95	479.95
APS ST 2000	Seagate 32171N, 2061MB, 7200 rpm	Call	519.95	549.95
APS WD 2000	Western Digital Enterprise, 7200 rpm	449.95	519.95	549.95
APS Q 4500	Quantum Viking, 4345MB, 7200 rpm	679.95	749.95	779.95
APS Q 4300	Quantum Atlas II, 4341MB, 7200 rpm	699.95	769.95	799.95
APS ST 4300	Seagate Barracuda, 4148MB, 7200 rpm	Call	769.95	799.95
APS ST 4500	Seagate Cheetah, 4348MB, 10000 rpm	N/A	N/A	849.95
APS Q 6400	Quantum Fireball Stratus, 6236MB, 5400 rpm	479.95	549.95	579.95
APS Q 9000	Quantum Atlas II, 8682MB, 7200 rpm	1,199.95	1,269.95	1,299.95
APS ST 9000	Seagate Barracuda, 8600MB, 7200 rpm	Call	1,169.95	1,199.95
APS ST 9100	Seagate Cheetah, 9000MB, 10000 rpm	N/A	N/A	1,349.95

APS HIGH-PERFORMANCE ULTRA SCSI DRIVES

Model	Description	Full Height
APS ST 23000	Seagate Elite 23, 22.1GB, 5400 rpm	$2,399.95

APS ULTRA WIDE SCSI DRIVES*

Model	Description	Int.	SR 2000	APS Pro
APS WD 2000 W	Western Digital Enterprise, 7200 rpm	$499.95	$569.95	$599.95
APS ST 2000 W	Seagate 32171W, 2061MB, 7200 rpm	Call	569.95	599.95
APS Q 4500 W	Quantum Viking, 4345MB, 7200 rpm	699.95	769.95	799.95
APS Q 4300 W	Quantum Atlas II, 4341MB, 7200 rpm	749.95	819.95	849.95
APS ST 4300 W	Seagate Barracuda, 4148MB, 7200 rpm	N/A	819.95	849.95
APS ST 4500 W	Seagate Cheetah, 4348MB, 10000 rpm	N/A	N/A	1,049.95
APS Q 9000 W	Quantum Atlas II, 8682MB, 7200 rpm	1,199.95	1,269.95	1,299.95
APS ST 9000 W	Seagate Barracuda, 8600MB, 7200 rpm	N/A	1,169.95	1,199.95
APS ST 9100 W	Seagate Cheetah, 8683MB, 10000 rpm	N/A	N/A	1,399.95

APS POWERBOOK STORAGE

Model	Description	Int.
APS PowerBook Drive	IBM DCMA-21080, 1080MB, 4000 rpm	$499.95

APS REMOVABLE DRIVES

Model	Description	Int.	SR 1000	SR 2000
APS SQ 5200	SyQuest 5200, 190MB	N/A	N/A	$389.95
APS Jaz	(with 1 cartridge) 1GB	N/A	$399.95	399.95

APS MO DRIVES

Model	Description	SR 1000	SR 2000	APS Pro
APS 230 MO	(with 1 cartridge) 217MB	$299.95	$369.95	$399.95
APS 640 MO	Fujitsu M2513A2#N	N/A	469.95	499.95
APS 2.6GB MO	Sony SMO-F544, 2.4GB	N/A	1,769.95	1,799.95

APS CD-ROM DRIVES

Model	Description	External
APS CD16	16X CD-ROM in slimline case	$179.95*
APS CD-R Plus	2X record/6X read CD-R (Sony)	399.95
APS CD-R	2X record/6X read CD-R (Phillips)	449.95
APS CD-RW	2X record/6X read rewritable CD-Recordable	549.95
APS CD-R Pro	4X record/6X read CD-R in Pro Enclosure	599.95
APS CD-R Pro	4X record/6X read CD-R in Full Height Enclosure	899.95
APS Jaz/CD-R System	2X record/6X read CD-R	799.95

Available in an SR 2000 Enclosure for an additional $100.00

APS TAPE BACKUP SYSTEMS

Model	Description	Internal	External
APS HyperQIC™	Travan 4 Conner QIC 3095, 8GB	$349.95	$399.95
APS HyperDAT®	DDS-2DC , 8GB	749.95	799.95
APS HyperDAT® Pro	DDS-2DC , 8GB	849.95	899.95
APS HyperDAT® III	DDS-3DC, 24GB	1,149.95	1,199.95

■ *Red indicates either new price or product*

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APS SCSI PowerPlug

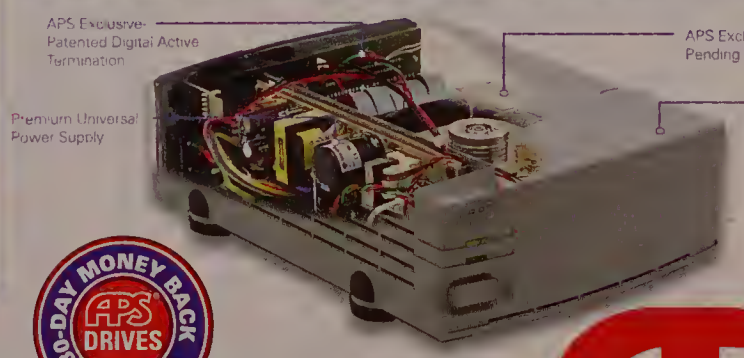
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External [MAC3240QX] $349

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External [MAC4300MCX] $380

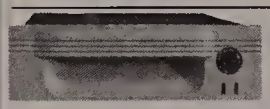
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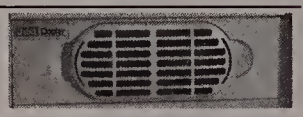
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9091MB	8.5ms	7200rpm	512K	MC3391	5yr	**$869**	**$919**
ULTRA SCSI A/V - Drives fine tuned for audio and video applications. 2MB Buffer!							
4550MB	7.9ms	7200rpm	512K	MC4345AV	5yr	$569	$619
9091MB	8.5ms	7200rpm	512K	MC3391AV	5yr	$919	$969
ULTRA WIDE SCSI							
4300MB	10ms	5400rpm	512K	MC4743W	5yr	**$339**	**$429**
4550MB	7.9ms	7200rpm	512K	MC4345W	5yr	$539	$629
9091MB	8.5ms	7200rpm	512K	MC3391W	5yr	$885	$975
ULTRA WIDE SCSI A/V - Drives fine tuned for audio and video applications. 2MB Buffer!							
4550MB	7.9ms	7200rpm	512K	MC4345WAV	5yr	$589	$679
9091MB	8.5ms	7200rpm	512K	MC3391WAV	5yr	$939	$1029

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2160MB	8ms	7200rpm	1024K	ST32272N	5yr	$459	$509
4550MB	8ms	7200rpm	512K	ST34572N	5yr	$699	$749
4550MB	7.5ms	10,000rpm	512K	ST34501N	5yr	$779	$829
9100MB	8ms	7200rpm	512K	ST19171N	5yr	$1060	$1110
9100MB	8ms	10,000rpm	512K	ST19101N	5yr	$1229	$1279
23200MB	13ms	5400rpm	512K	ST423451N	5yr	$2299	$2399
WIDE SCSI							
1050MB	9ms	5400rpm	512K	ST31055W	5yr	$299	$389
2160MB	8ms	7200rpm	512K	ST32272W	5yr	$499	$589
4550MB	8ms	7200rpm	512K	ST34572W	5yr	$739	$829
4550MB	7.5ms	10,000rpm	512K	ST34501W	5yr	$829	$919
9100MB	8ms	7200rpm	1024K	ST19171W	5yr	$1109	$1199
9100MB	8ms	10,000rpm	512K	ST19101W	5yr	$1279	$1369
23200MB	13ms	5400rpm	512K	ST423451W	5yr	$2299	$2449

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2151MB	10ms	5400rpm	128K	FB32160S	3yr	$238	$288
2275MB	8ms	7200rpm	512K	VK32275S	5yr	$359	$409
3228MB	10ms	5400rpm	128K	FB33240S	3yr	**$299**	**$349**
4310MB	10ms	5400rpm	128K	FB34320S	3yr	$333	$383
4550MB	8ms	7200rpm	512K	VK34550S	5yr	$560	$610
4550MB	8ms	7200rpm	512K	XP34550S	5yr	$660	$710
6448MB	10ms	5400rpm	128K	FB36480S	3yr	**$343**	**$393**
9100MB	8ms	7200rpm	512K	XP39100S	5yr	$969	$1019
ULTRA WIDE SCSI							
2275MB	8ms	7200rpm	512K	VK32275W	5yr	$359	$449
4550MB	8ms	7200rpm	512K	VK34550W	5yr	$560	$650
4550MB	8ms	7200rpm	512K	XP34550W	5yr	$660	$750
9100MB	8ms	7200rpm	512K	XP39100W	5yr	$969	$1059

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9100MB	8ms	7200rpm	512K	M2949S	5yr	$979	$1029
WIDE SCSI							
4400MB	8ms	7200rpm	512K	M2954W	5yr	$575	$625
9100MB	8ms	7200rpm	512K	M2949W	5yr	$1025	$1115

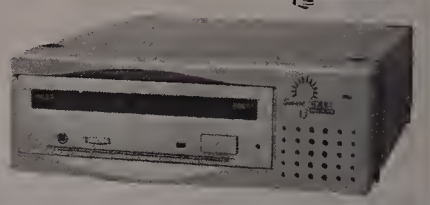
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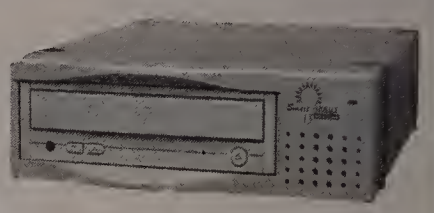
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- Choose tray or caddy loading
- Includes 5 FREE blank CDs.
- Includes #1 rated Adaptec Toast software.

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CD-R media only $3.50ea with this drive!

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- Includes 5 FREE rewritable CDs.
- Includes #1 rated Adaptec Toast software.

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Duo Master with Jaz Drive $929
Complete 2MB external $659
Duo Master with Jaz Drive $969
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• CD ROM DRIVES •

					External
Toshiba	15X	99ms	256K	Tray	$185 [XM3801XM]
NEC	16X	100ms	256K	Tray	$189 [CDR1610XM]
Nakamichi	16X	130ms	5 Disk Changer		$339 [MJS16XM]
Plextor	20X	95ms	512K	Tray	$277 [PX20TSM]
Panasonic	24X	85ms	512K	Tray	$215 [CDR508XM]

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2GB, 4mm, DAT, 12MB/min	$659 [C1534XM]
2-4GB, 4mm, DDS DAT, 42MB/min	$715 [C1536XM]
4-8GB, 4mm, DDS-2 DAT, 60MB/min	$909 [C1599XM]
12-24GB, 4mm, DDS-3 DAT, 120MB/min	$1249 [C1554XM]
72-144GB, 4mm, DDS-3 DAT, 6 tape loader, 120MB/min	$2779 [C5648XM]
SEAGATE	
2-4GB, 4mm, DDS DAT, 66MB/min	$699 [STD24000XM]
4GB, TR4 minicartridge, 30MB/min	$439 [TST8000XM]
4-8GB, 4mm, DDS-2 DAT, 48MB/min	$849 [STD28000XM]
12-24GB, 4mm, DDS-3 DAT, 132MB/min	$1189 [STD22400XM]
EXABYTE	
3.5-7GB, 8mm, DAT, 32MB/min	$1275 [EXB8205XM]
7-14GB, 8mm, DAT, 60MB/min	$739 [EXB8700LTXM]
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20-40GB, 8mm, AME, 360MB/min	$3879 [EXB8900XM]
70-140GB, 8mm, DAT, 10 tape loader, 60MB/min	$4229 [EXB10HXM]
SONY	
4-8GB, 4mm, DDS-2 DAT, 44MB/min	$759 [SDT5000XM]
4-8GB Pro, 4mm, DDS-2 DAT,90MB/min	$829 [SDT7000XM]
12-24GB, 4mm, DDS-3 DAT,144MB/min	$1109 [SDT9000XM]
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4.6GB Optical $159 [OMDR4.6]
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4mm125M tape $31 [DAT125M]
4mm Cleaning tape $15 [DAT4MMCLEAN]
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DLT 20-40GB $99 [DLT4]

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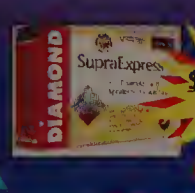
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Apple PowerBook 1400C 133/16MB/1.3GB/6xCO	$2799	$79.07	
Apple PowerBook 3400C 200/16MB/1.3GB/6xCD	$3999	$112.97	
Apple PowerMac 6500 250/48MB/4GB/12xCD/Zip	$2159	$61.00	
Apple PowerMac 6500 300/64MB/4GB/12xCD/Zip	$2599	$73.42	
SuperMac S900L 200/32MB/2.1GB/8xCD/IMS 4MB	$2499	$70.60	
SuperMac S900L 233/32MB/2.1GB/8xCD/IMS 8MB	**$2899**	**$81.90**	SALE
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SuperMac S900L DP250/64MB/4 GB/12xCO/IMS 8MB/Zip	$6795	$191.96	
StarMax 5000 225/32MB/2.5GB/16xCD/2MB VRAM/Enet	$1939	$54.78	
StarMax 5000 225/32MB/2.5GB/16xCD/2MB VRAM/Modem	$1939	$54.78	
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PowerBase 200/16MB/2GB/12xCO/2MBVRAM	$999	$28.22	
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SALE

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64MB	**$249**	**NA**
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Philips 2x/6xCDR with Toast/cart	$449
Yamaha 4x/6xCDR with Toast/cart	$699

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SALE

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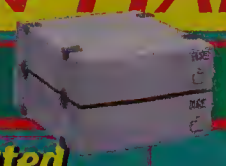
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Quantum SPECIAL PRICE!	2.1GB	Atlas II	8 MS	7200	512K	295	345
Quantum	3.2GB	Stratus	9 MS	5400	128K	320	370
Quantum	4.3GB	Stratus	9 MS	5400	128K	365	415
Micropolis SPECIAL PRICE!	4.3GB	Stinger	9 MS	5400	512K	345	395
Quantum SPECIAL PRICE!	4.3GB	Viking	9 MS	7200	512K	575	625
Quantum	4.5GB	Atlas II	9 MS	7200	512K	645	695
Western Digital	4.3GB	Enterprise	8 MS	7200	512K	675	725
Micropolis	4.3GB	M3243	8 MS	7200	512K	525	575
Seagate	4.3GB	Barracuda	8 MS	7200	512K	645	695
Micropolis	4.3GB	Tomahawk	8MS	7200	512K	595	645
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IBM	9.1GB	Ultrastar	8MS	7200	512K	945	995
Micropolis SPECIAL PRICE!	9.1GB	Tomahawk	8 MS	7200	512K	895	945
Quantum	9.1GB	Atlas II	9 MS	7200	1024K	995	1045
Seagate	9.1GB	Barracuda	8 MS	7200	512K	1075	1125
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Seagate Barracuda	2.2 GB	512K	8MS	7200	495	575
Quantum Viking	2.2 GB	512K	7.9MS	7200	375	455
Fujitsu	4.1 GB	512K	8MS	7200	675	755
Western Digital	4.3 GB	512K	8MS	7200	675	755
Micropolis WAV SPECIAL PRICE!	4.5 GB	2048K	7.5MS	10000	635	715
Quantum Atlas 2	4.5 GB	512K	8MS	7200	655	735
Quantum Viking	4.5 GB	512K	8MS	7200	595	675
Seagate Cheetah SPECIAL PRICE!	4.5 GB	512K	8MS	7200	795	875
Seagate Barracuda	4.5 GB	512K	8MS	7200	695	775
IBM UltraStar XP	4.5 GB	512K	8MS	7200	725	805
Micropolis WAV SPECIAL PRICE!	9.1 GB	2048K	7.9MS	7200	1075	1155
Quantum Atlas 2	9.1 GB	1024K	8MS	7200	1025	1005
Seagate Barracuda	9.1 GB	512K	7.5MS	10000	1115	1195
Seagate Cheetah	9.1 GB	512K	8MS	7200	1195	1275
IBM UltraStar XP SPECIAL PRICE!	9.1 GB	512K	8MS	7200	995	1075
Fujitsu 9 GB	9.1 GB	512K	8MS	7200	1025	1085
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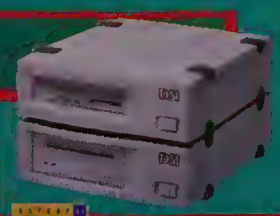
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Sony 9000 DD3 SPECIAL PRICE!	24GB	120 Mb/Min.	1169
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DLT™ 4000	40GB	180 Mb/Min.	3945
HP1553 DDS2	48GB	60 Mb/Min.	2455
Sony AITSDX 300C 8mm SPECIAL PRICE!	50GB	120 Mb/Min.	3295
DLT™ 7000	70 GB	600 Mb/Min.	7295

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DLT™ 4500	200GB	180 Mb/Min.	6485
DLT™ 4700	280GB	180 Mb/Min.	7895

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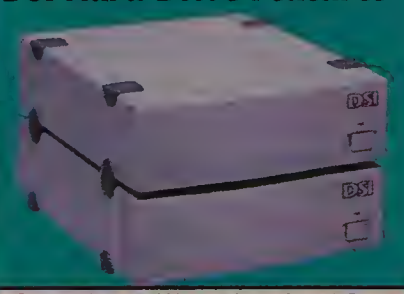
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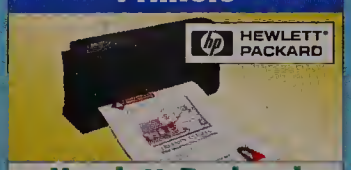


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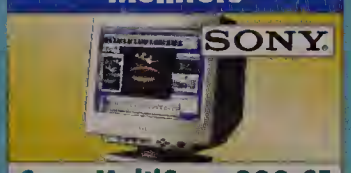


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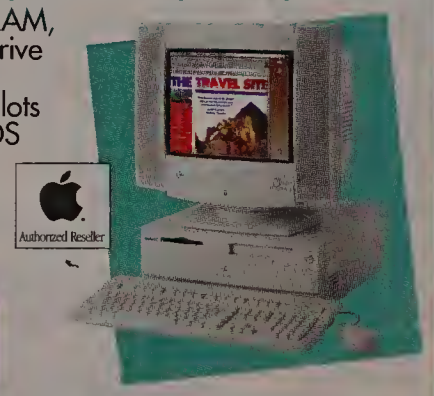
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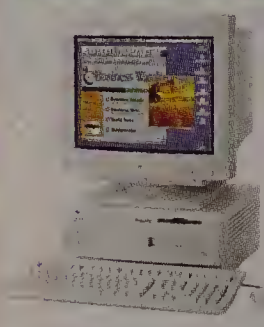
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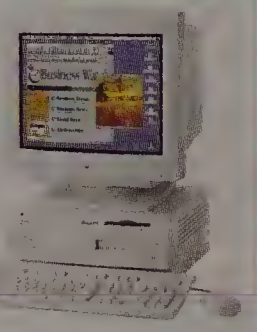
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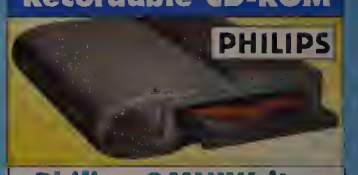


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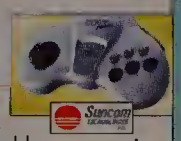
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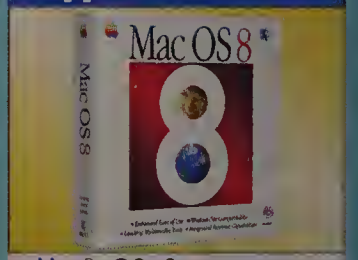
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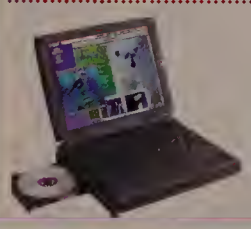
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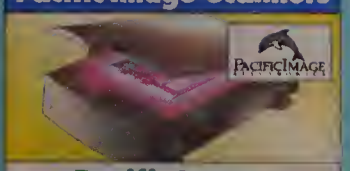
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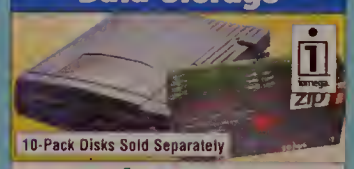
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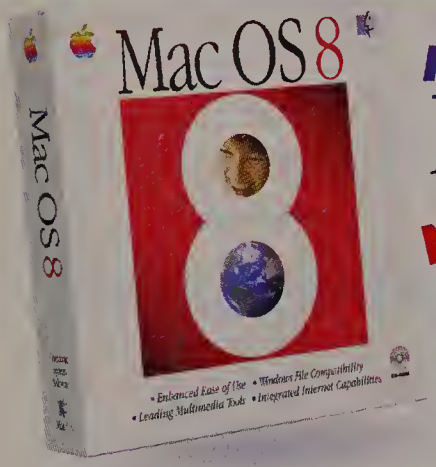
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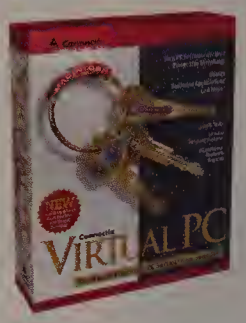


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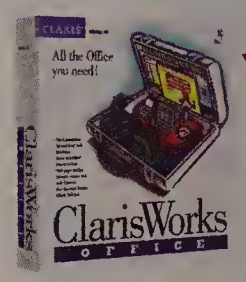
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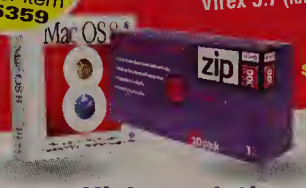
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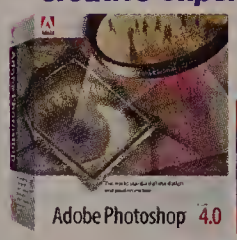
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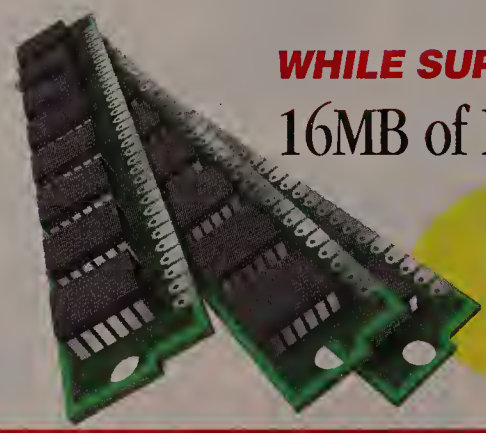
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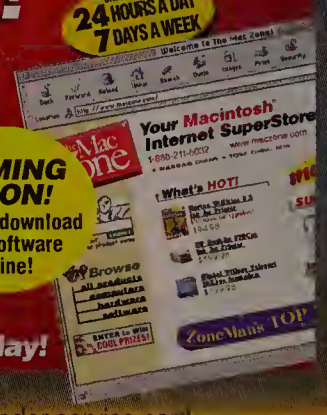
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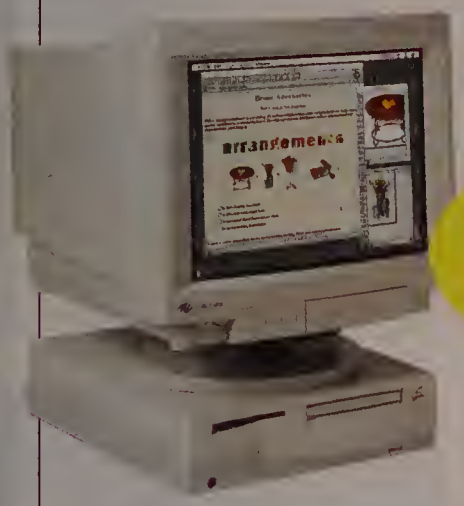
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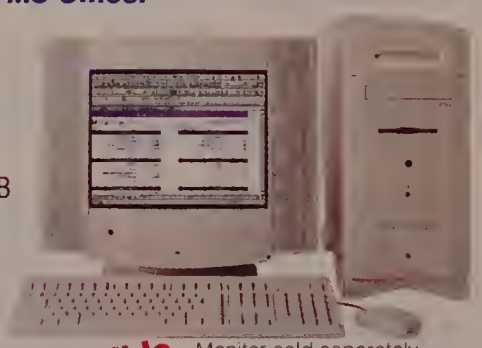
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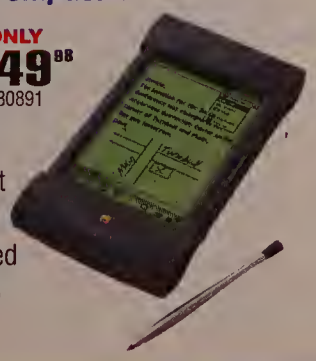
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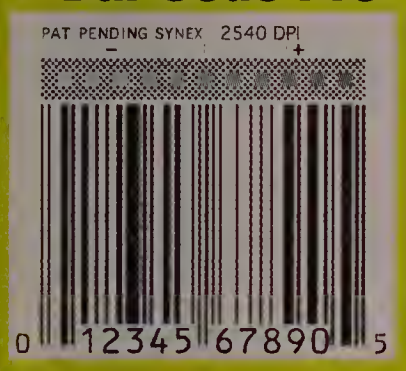
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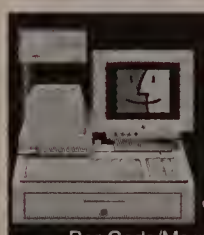
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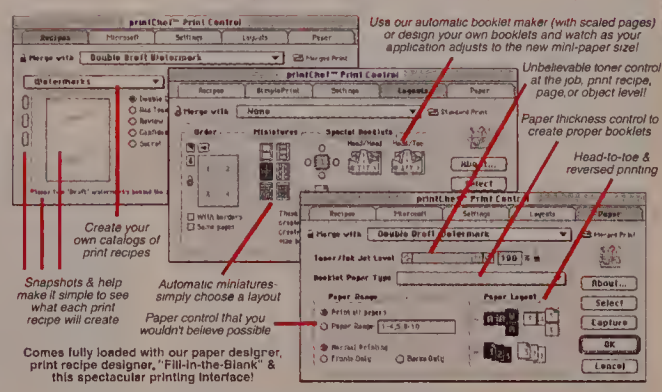
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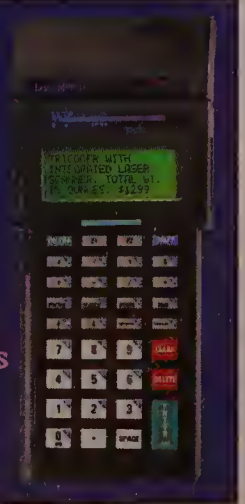
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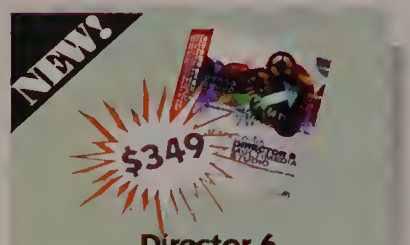
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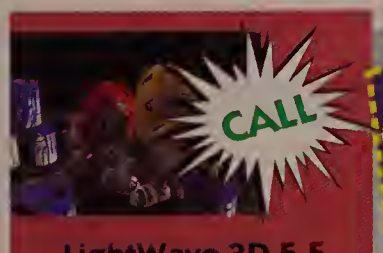
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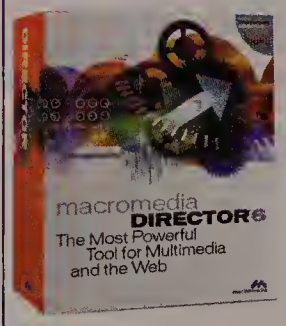
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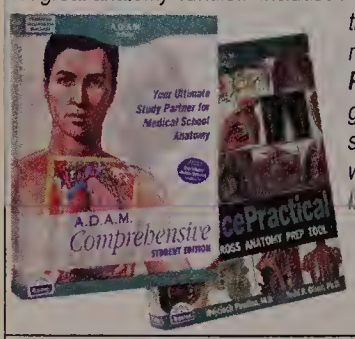
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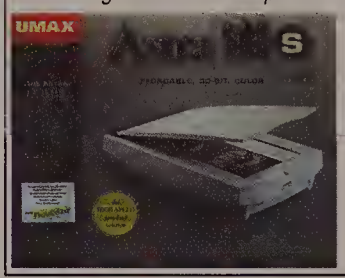
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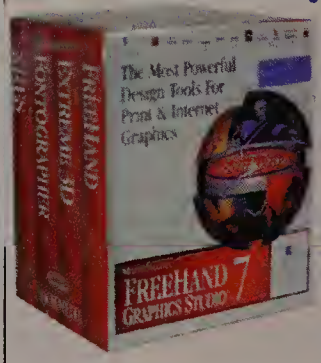
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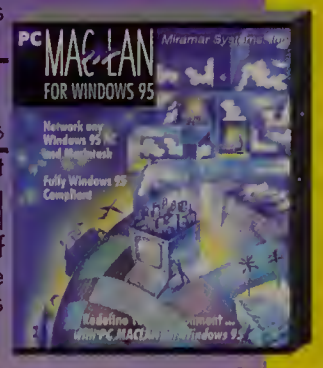
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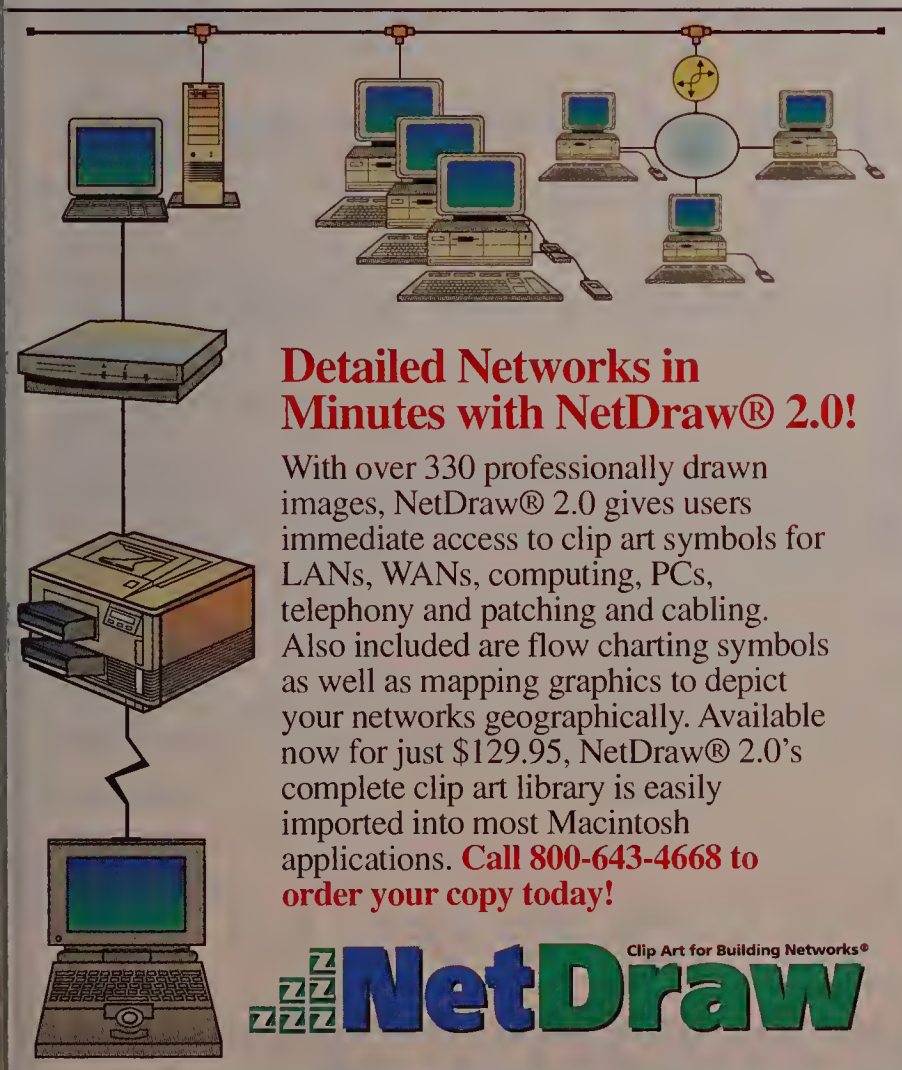
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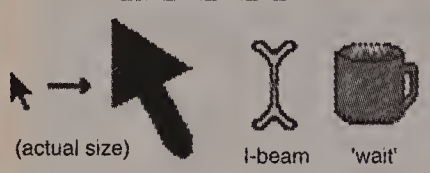
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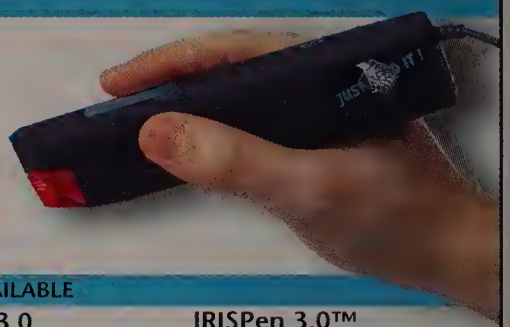
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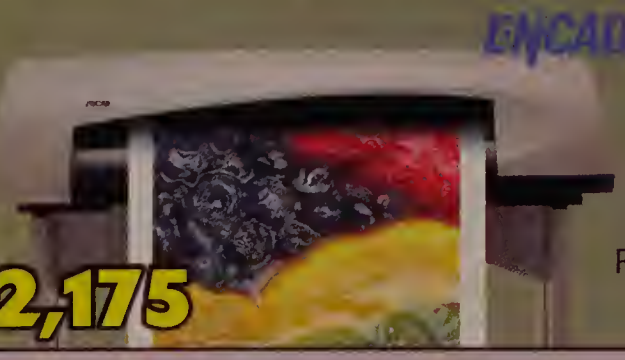
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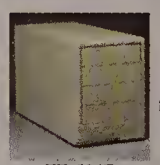
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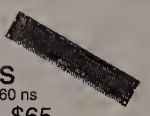
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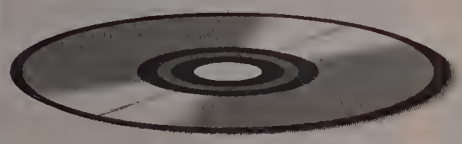
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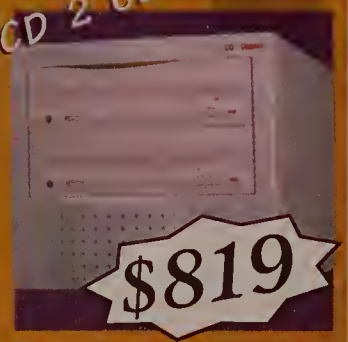
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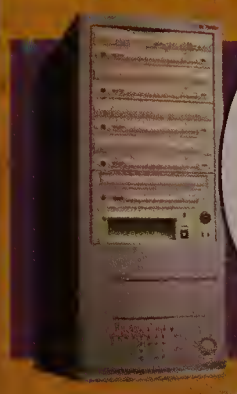
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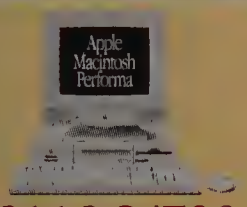
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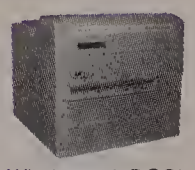
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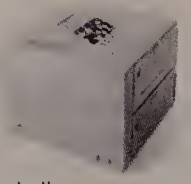
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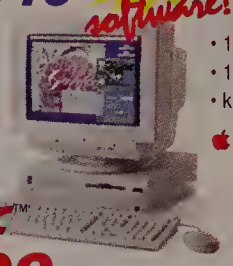
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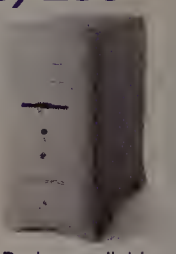
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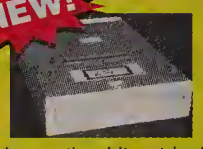
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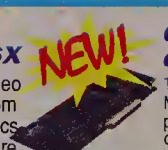
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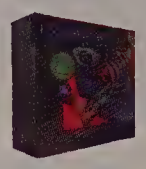
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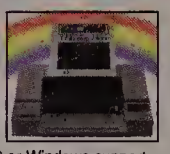
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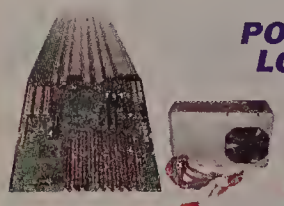
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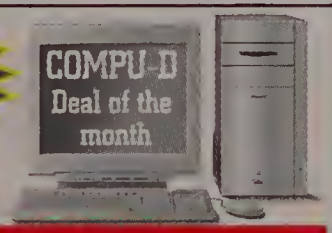
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4400/200	32-2GB, 12xCD, DOS	$2245
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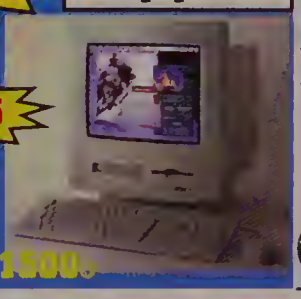
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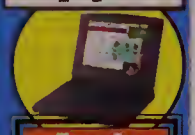
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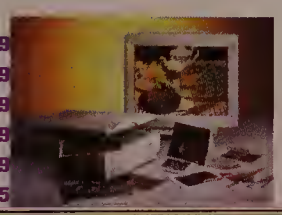
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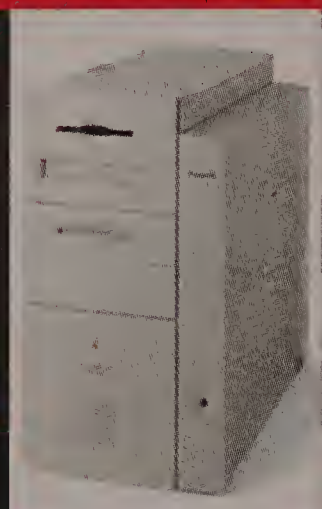
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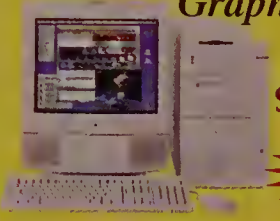
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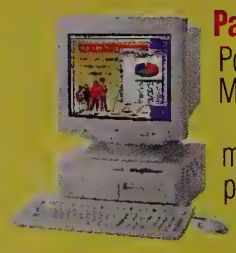
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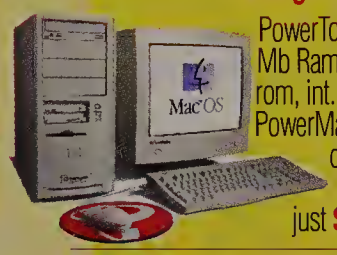
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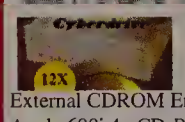


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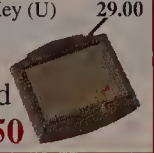
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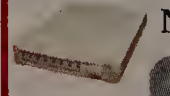
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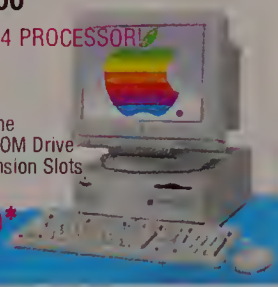
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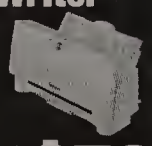
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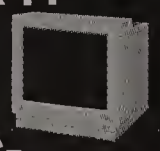
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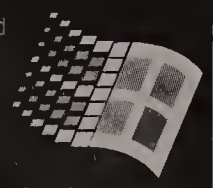
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- Trinitron tubes
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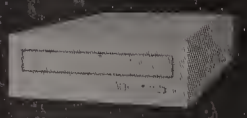
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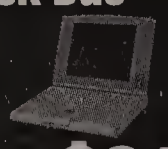


- 100Mhz 603e PPC
- Active Matrix Color

* Add Dock for $299
* Add 14.4 modem for $50
* Add 12MB RAM for $100

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PowerBook Duo 280c



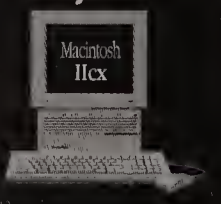
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- 33Mhz 68040
- Active Matrix Color

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* Add 14.4 modem for $50
* Add 12MB RAM for $100

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Macintosh 13" RGB - Trinitron Display	$179	PB 500 8MB/Duo 8MB - RAM Module	$39
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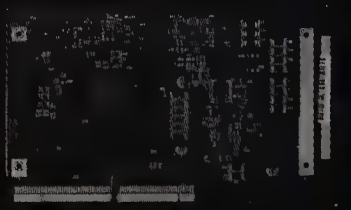
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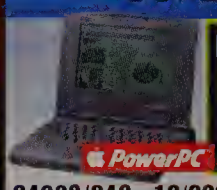
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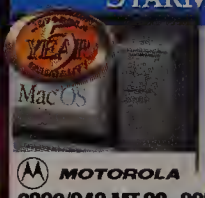
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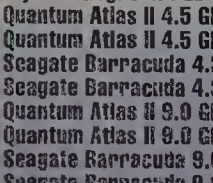
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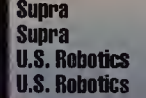
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Linotype	Linocolor Jade 600 dpi	499
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Microtek	Scanmaker III w/Photo	1325
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Umax	Astra 1200S 600 dpi	435
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24M8	Powerbook 1400 Module	155
8M8	Powerbook 3400c Module	87
16M8	Powerbook 3400c Module	155
32M8	Powerbook 3400c Module	189
64M8	Powerbook 3400c Module	459
128M8	Powerbook 3400c Module	939
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16MB	168 Pin Oimm 60NS 5Volts	74
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64MB	168 Pin Oimm 60NS 5Volts	249
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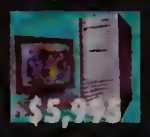
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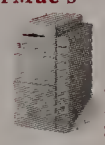
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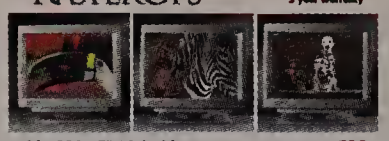
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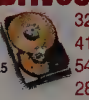
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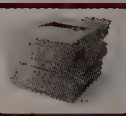
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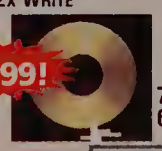
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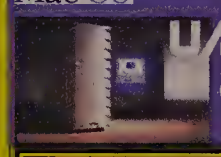
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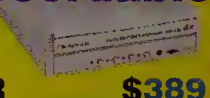
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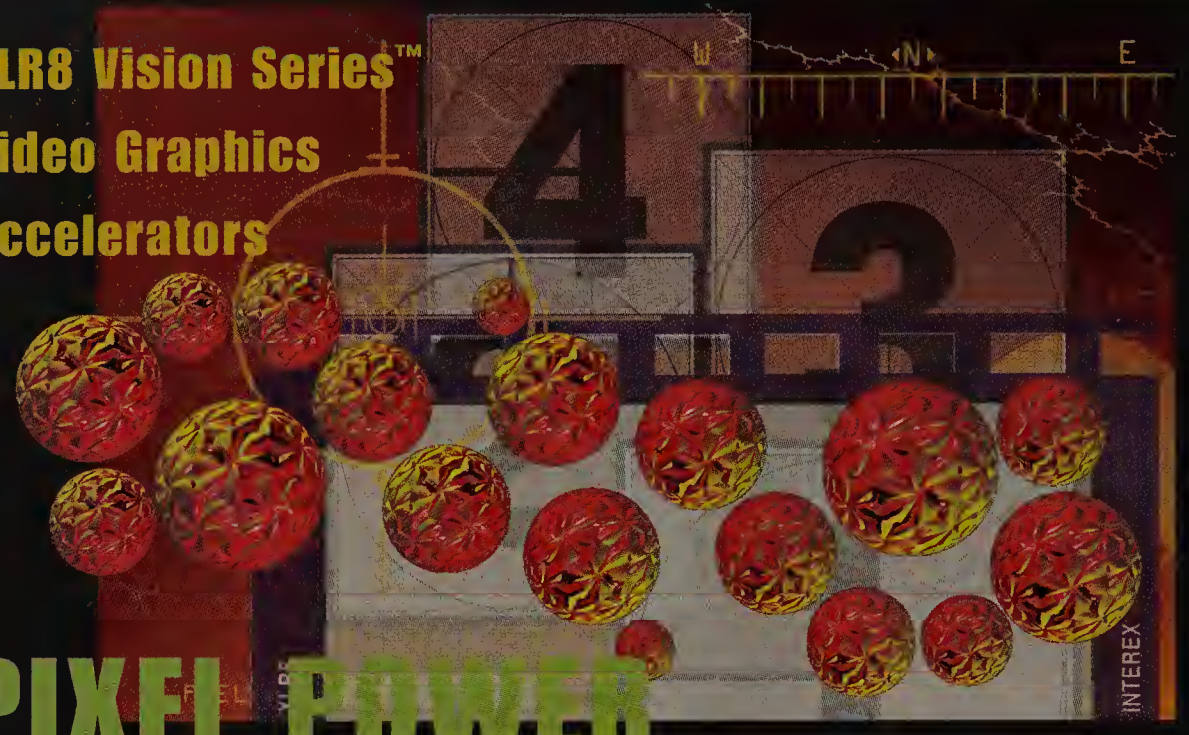
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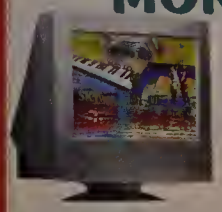


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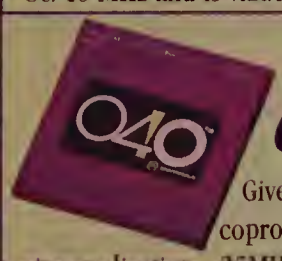
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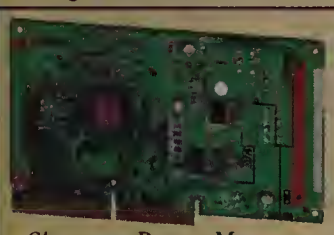


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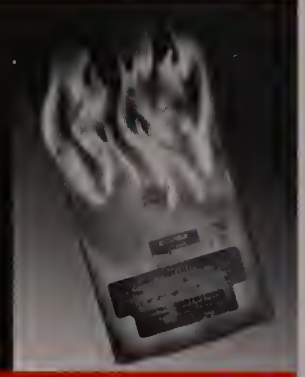
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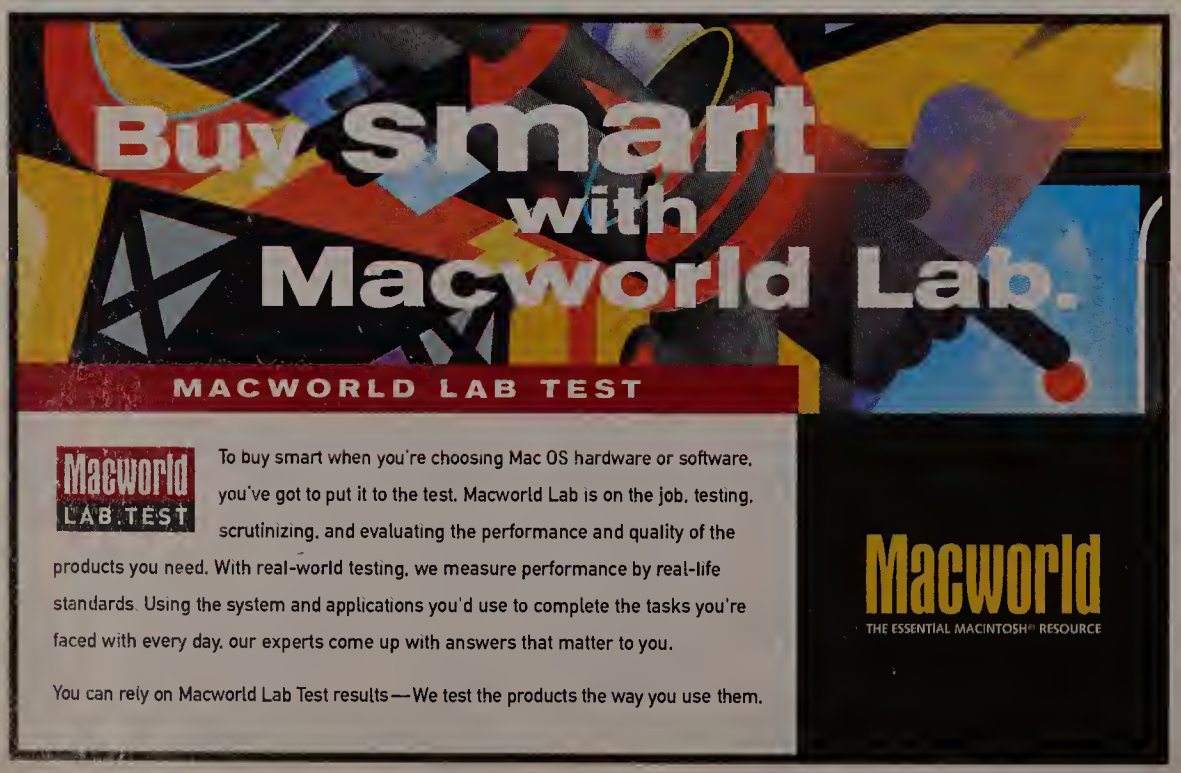
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continued from page 250

Apple news stories. If an article is grievous enough, memos from EvangeList members soon jam the author's e-mail box.

When James Coates covered Apple's purchase of Next in the *Chicago Tribune*, for example, he chose an angle particularly painful for Mac fans: that non-PowerPC Macs wouldn't be able to run Rhapsody. The headline: "Mac Users Abandoned."

The revenge of the EvangeListas was swift. "My America Online e-mail account is all but unusable, clogged with angry and often abusive notes," Coates wrote in a follow-up column. "Say something negative about Macs and you'll be accused of being a tool of the 'Apple-bashing' establishment."

EvangeList Backlash

But the EvangeList approach can backfire. "Kawasaki thinks he's doing a great thing," a metropolitan-paper tech columnist told me, "but he's actually just ticking us all off. If he wants less-emotional coverage of Apple, he should start by calling off his hounds."

Longtime Apple denigrator Stewart Alsop, whose columns landed him on the EvangeList 8 times in 12 months, would probably agree. In *his* follow-up column, he referred to Kawasaki as a guy who "mobilizes thousands of less-informed people to harass and intimidate journalists, [recalling] Senator Joe McCarthy's attacks on actors, journalists, and other 'subversives' in the early 1950s."

Could it be? Is there really such a thing as EvangeList Backlash?

"These journalists depict us as pod people chanting: 'We are Kawasaki's minions and must attack,'" chuckles John Halbig, the EvangeList's administrator. "But EvangeListas are free thinkers. They sign on when they want to, unsubscribe when they want to, write letters when they want to. If the journalists are admitting that their emotions are affecting how they write their articles, they're in the wrong business."

Painful though the EvangeList treatment may be, it works, at least sometimes. "I really resent what Kawasaki did to me because of the mean-spirited mail that it brought and because of the damage it did to my reputation," James Coates told me. "But he has done a real service to Apple in reminding me and everybody else that there are huge numbers of people who really care about their Macs." And in his follow-up column, he wrote, "This writer will never again write an Apple-related story without a keen gun-shy appreciation that critical hordes are judging every word."

Better yet: a *Boston Globe* writer's factually shaky Mac OS 8/Windows 95 comparison began with this snide baloney: "In two weeks, Apple Computer will release Macintosh OS 8. And hardly anyone cares." After a week of, er, *discussion* with EvangeListas, his follow-up column was a tad more conciliatory: "Overall, I'd give the Mac the edge. . . . Macintosh computing isn't dead, whatever happens to Apple."

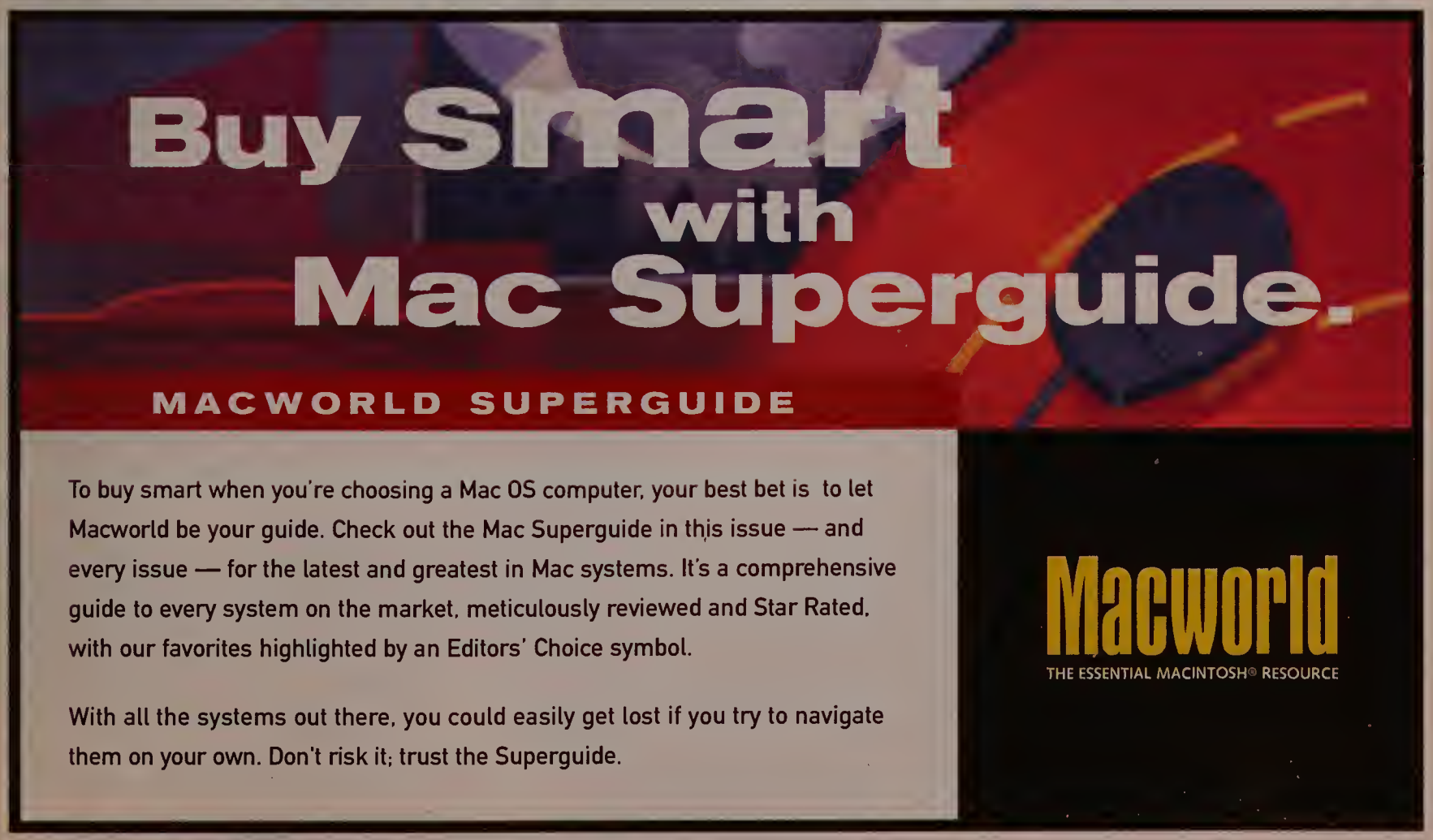
Take Back the Streets

Until Apple gets a clue about marketing and PR, it looks as if we the readers will have to continue serving as the intergalactic Apple press watchdog.

But ironically, deep down, these writers must actually believe that Apple *won't* go under; if it did, what on earth would they write about? **m**

DAVID POGUE (*www.pogueman.com*) is coauthor of *The Weird Wide Web* (IDG Books Worldwide, 1997).

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The Desktop Critic

by David Pogue

The Power of the Press—and the People

THE PRINT-MEDIA APPLE WATCHERS ARE SNARLIER THAN EVER

GIL AMELIO DIDN'T bring the Apple battleship all the way into the harbor, but he did plug in some excellent coordinates: he fixed the hardware problems, the OS strategy, and the madcap spending sprees. If you ask me, Apple's affairs are thoroughly in order for a comeback. So how come its problems aren't over?

Because Gil stank at *marketing.* "I'm a technologist," he told the *San Jose Mercury News.* "Figuring out how to increase the sales at Sears Roebuck was not exactly my strength." That's putting it mildly.

Here we are, almost two years into Apple's slump, and astoundingly slanted articles continue to appear in the mainstream press. The tech writers are entitled to their opinions, of course, but nobody is served by the thick layer of sensationalistic venom that accompanies their stories. *Fortune:* "The only sensible conversation to have about Apple is . . . how long it will take to die." *Business Week:* "Apple is left in a shambles. Amelio's forced resignation has all the signs of a classic blunder—too late, too little." *Time:* "[Apple is] a chaotic mess without a strategic vision and certainly no future."

These alarmist opinions fuel a vicious circle: the public gets paranoid, Apple's sales suffer, the stock slumps, and we get "I told you so" articles by the nasties.

Checking Up on the Press

Now, in other fields there are media checks and balances. Every month, Wall Street analysts write predictions about the stock market, such as: "Our firm sees a major market correction by mid-July." And every month, *Smart Money* magazine's hilarious *Reality Check* column returns to those months-old predictions to see just how wrong the experts were. "If that's what your firm sees," *Smart Money* might say, "it needs contact lenses; the market skyrocketed all summer long." In other words, the experts get graded. The *New York Times* even runs a column that checks up on *Smart Money,* grading each issue against other finance mags.

This column gets inspected and corrected by at least three editors who've been in this business longer than I have. But who holds mainstream-press tech writers accountable? Not their editors; computers are too specialized a field.

So the trusting public gets factual gaffes, such as *Time*'s assertion that System 7 was considered a flop when it was introduced. (Not in my reality.) Or we



get reporting without context: shock, for example, that Gil Amelio's severance pay was $7 million after 17 months on the job—never mind that big good-bye checks are standard in large corporations: AT&T's outgoing guy got $26 million (after 9 months); and although a lawsuit is pending, Disney's guy got *$90 million* (after 14 months).

Or we get built-in bias: a *Fortune* columnist who admitted being an investor in Be, Inc., for example, predicted Apple's demise because it chose the Next OS instead of Be's. *Business Week* quoted an expert as saying, "Apple has lost the OS war, and there's no point fighting"—not a surprising quote, since the "expert" is also an Intel director.

Hell-Checkers

Fortunately, there *is* one final judge of bias, distortion, and error—we, the reading public. In the last two years, the Macintosh war over public opinion has been waged in the letters columns of the mainstream business rags. But letters columns don't affect nearly as many people, or carry nearly the same authoritative weight, as the original article. Nor do they affect the same group of readers; once an article has been published, the damage is done.

I've occasionally fired off, with superhuman restraint, a polite letter to the editors of some fine mainstream publications, pointing out their tech writers' errors. But the consequences left me even more disappointed than the original articles. In all three cases, my letter was forwarded to the article's author; in all three cases, the author responded directly to me with a testy, defensive e-mail. One guy even insisted that the factual errors weren't his, and he informed me that he'd see to it that my letter wasn't published. (They published it anyway.)

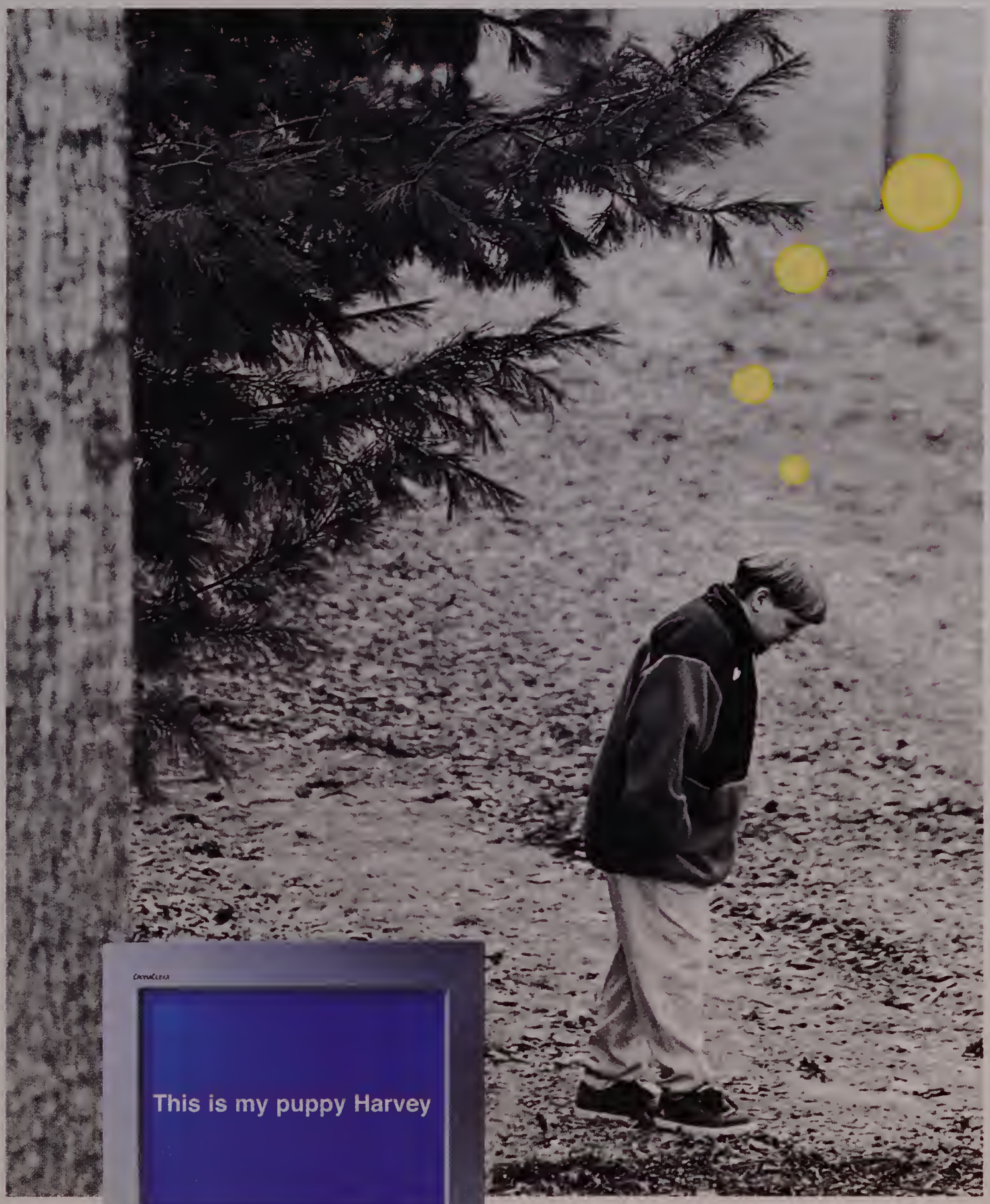
The EvangeListas

There *is* one more-or-less official press watchdog, actually. It's the Mac EvangeList: an Internet-based mailing list with 40,000 members, supervised by Apple's Guy Kawasaki. (You can subscribe at *www.evangelist.macaddict.com.*) Each day, EvangeList members receive e-mail notifications of positive Apple news—and anti-

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STUART BRADFORD





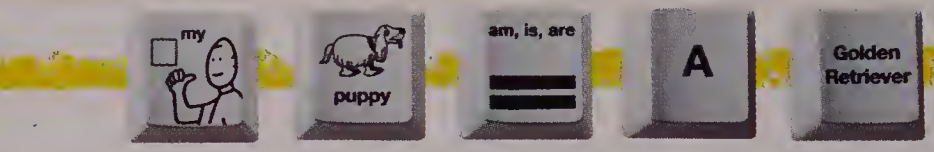
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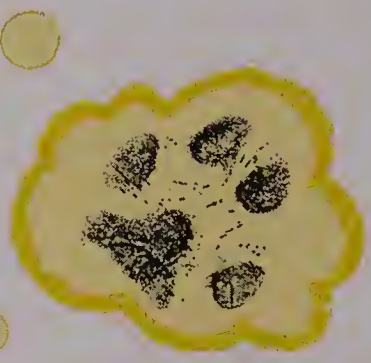
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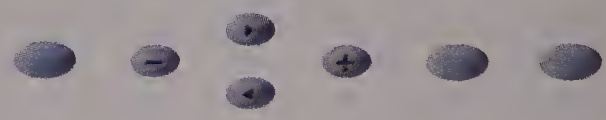
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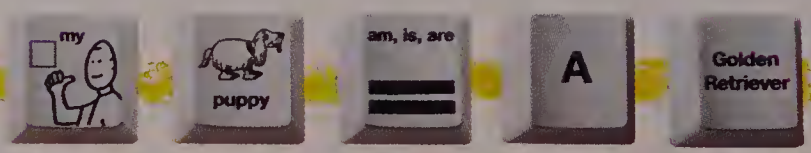


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